

COAL AGE

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Cures that Kill

By R. DAWSON HALL



It is unfortunate that many of the proposed remedies for the situation in the coal mines are temporary palliatives rather than cures. Even the best of them may harm rather than help many of the mine workers. We strive, for instance, to reduce the seasonal quality of the industry by one of the many remedies suggested—differentials in freight rates, increases in foreign trade, differentials in price or six-hour days and five-day weeks.

Suppose, which is questionable, that any or all of these will solve the seasonal difficulty and that we are willing to pay the price that such remedies involve, imagine then that coal flows as a steady stream from the mines under some self-regulating, self-feeding device. Then there will be no coal shortage in the winter, and the price will always be so low as to keep the poorer and thinner coal out of the market. The men who now mine this coal will be out of work, winter as well as summer. Thus the men who have turned the country upside down with their copious, and quite natural lamentations will be in worse condition than ever. Their griefs will not be seasonal but perpetual. They will be squeezed out of the industry as they are now squeezed in it.

Price regulation is still urged. When it is put in operation there will either be a uniform price throughout the country or a locality price based on cost plus. A uniform price would close the mines of a large area of the country.

A plus-cost arrangement, based on the general costs of the locality, such as was in force during the war, is a more feasible plan and the one more likely to be adopted. Such a plan in times when coal is not greatly in demand will close down all the mines producing coal at a high cost for there will be no demand for such expensive coal. As conditions now are, as soon as a shortage begins to be foreshadowed there is a rush for the better grades of coal. The prices of such grades go up, and the less fortunate coal fields get a little business at a figure, it is true, that barely pays.

With regulated prices this increase in the better coals would not take place and not until there was a coal famine would the high-cost mines have any work at all to do. Regulation of price will tend to starve out the high-cost mines and incidentally will tend to aid in making the coal business more seasonal than ever, for who will buy early when there is no bait in the direction of a varying price.

Price regulation with a differential has been advocated, and, indeed, it has more arguments in its favor than price regulation without such a differential. But any kind of regulation is socialistic in that it removes the reward for economical production. Any cost-plus scheme causes the producer to be indifferent as to his costs or anxious to increase them, for in case of percentage compensation, with increased cost comes increased rewards. That these rewards have this effect was well shown by the action of some manufacturers who during the war had government contracts.

The operators would rarely be guilty doubtless, even in peace, of such policies as then occurred, and making a district price would in a degree prevent any such complete indifference to cost but in a minor degree the condition would exist. We all look for a reward for our activities. Without it we are apt to be lethargic. We seek for a recompense for our improvements. If it is not given, we are afraid to expend our money for fear of loss.

Hence price regulation with a differential will only cure the seasonal difficulty. It will not help the workers in the high-cost mines to get steady work. It will only subject them to worse conditions.

It is a strange situation. Those who are leading the fight against seasonal stagnation and price regulation will be quite likely to face an all-year stagnation instead of the steady work they are seeking.

Some Thoughts on Filing Systems

Exact information concerning the whereabouts of maps, drawings and other data is a necessity in the engineering department of all mines. Many filing systems for this material have been employed with more or less success. The system employed at the Bureau of Mines Station in Pittsburgh appears to meet all requirements and is accordingly here described in some detail.

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IF there is one department of a large coal company that has need of a precise, exact and well regulated filing system, it is the department of engineering. The filing of maps, tracings, blue prints, notes and correspondence, presents a problem that must be solved in an efficient manner or much of the accuracy of the field work and the skill of the designer or draftsman will go for naught, through the desired article being unavailable at a moment's notice.

farther than others in the development of filing schemes, and in so doing have increased the efficiency of their engineering departments. No matter how highly the system adopted has been developed, there is always room for improvement, for any filing plan even at best is laborious and a great killer of time.

It was not many years ago that drawings of all kinds were rolled up and placed in box-like compartments or pigeon holes. A small tag attached to a corner of the drawing by a string,



THE DRAFTING ROOM OF THE U. S. BUREAU OF MINES AT PITTSBURGH, PENN.

Under present-day practice of using the telegraph as the medium for quickly obtaining information, only an approved filing system can go hand in hand with the afore-mentioned means of communication, since otherwise much of the effectiveness of the telegram is lost. While many of the engineering problems that confront any coal company are akin to those encountered by other firms, yet, in determining the kind of a filing system to be installed, much must be left to the originality and initiative of the man in charge. Certain fundamentals that must serve as the basis for any system, should of course form the foundation for all similar schemes, until such a time as these fundamentals have been replaced by others more practical.

There is a wide divergence of opinion as to just what constitutes a good system. Some companies have progressed

was allowed to hang out from the compartment. This method has gradually been replaced by the more practical scheme of giving the drawing a series number and filing it flat in a drawer or specially constructed cabinet. There are numerous types of cabinets on the market that have been designed for this very purpose, the use of which reflects a progressive and up-to-date spirit. In particular, is the flat filing of tracings to be recommended, lest in the making of blue-prints, lines are brought out that may prove deceiving and the print thus lose much of its value. It may be said therefore that the approved method of filing drawings, is that in which each bears a serial number on the title and is filed flat. It is impossible to follow this scheme when it comes to large permanent location maps; however, it should apply as far as feasible.



PHOTOGRAPHIC LABORATORY AT THE U. S. BUREAU OF MINES

A rather common system that is used by many large coal companies, is to divide their operations into districts or divisions. In devising a serial number for use in the title space of a drawing, one of the letters of the alphabet is usually taken to denote a district. After the district letter in the series number should come a figure representing a particular mine. Following the mine number, a letter is used to designate a particular type of construction work or some unit of the plant itself. The use of T for tippie, S for sub-station, etc., is advocated by some departmental heads. An example of this type of series number would be F-14-B, where B refers to the boiler house of Mine No. 14 in F district.

NUMBER OF CABINETS EMPLOYED

The number of filing cabinets used depends upon the extent of the companies' operations. A whole cabinet may be taken up by one mine or even by one unit of the mine, though in the latter contingency this seldom occurs. Then again, the cabinet may serve to hold all of the drawings relating to an entire division. A cabinet such as the one manufactured by the Yawman & Erbe Co. of Rochester, N. Y., is an example of the flat filing type.

In filing the drawings vertically within the cabinet, they should be placed upside down with face to the rear. The title bearing the series number should then be in position at the upper right hand side of the cabinet. Whenever a drawing is placed in the cabinet, some care should be exercised to keep the titles in as near perfect alignment with each other as possible.

A 4 by 6 in. index card is an appropriate size for listing the various types of drawings. The index cards for this system are filed alphabetically with respect to the name of the mine, plant unit, type of construction involved in the drawing, etc. On the index card is found the title of the drawing, whether it be tracing, blue-print or original, the name of the draftsman or designer, and any other information that might be applic-

able. Care exercised in cross-indexing the cards from the standpoint of appropriate titles, naturally increases the value of the entire system. Large permanent maps and tracings that are too large to permit of vertical filing, are given the customary arrangement in pigeon holes and are provided with extended tags. Another variation of the scheme of series number is the use of A and B, etc., in the series to designate the scale, that is, whether the map is, say, 100 or 200 ft. to the inch.

In quite a few large offices, all drawings are still rolled up and filed in pigeon holes. In this case the drawing bears the same series number as the compartment in which it is filed. The index cards are made out in the same manner as previously mentioned. This system is easy to follow for anyone who is familiar with it. Its chief drawback is the unnecessary wrinkling of tracings. This is not conducive to long life. Furthermore the series numbers do not represent anything definite or tangible but merely show the compartment in which the drawing may be found.

SYSTEM USED BY THE BUREAU OF MINES

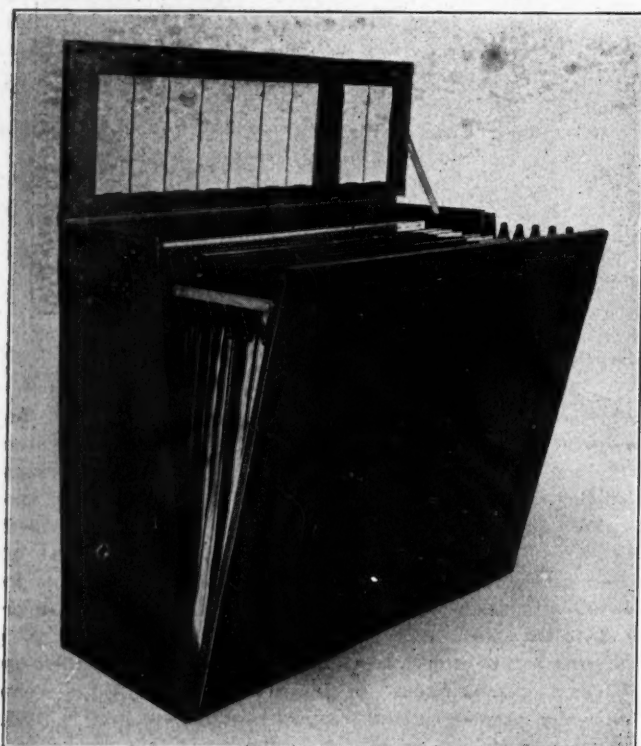
An example of one of the best filing systems in use today may be found in the Pittsburgh Station of the U. S. Bureau of Mines. Many of the requests for information, drawings and photographs that come to this institution are highly indefinite. Any filing system that can stand up under the various tests that are put to it at the bureau is well worthy of consideration. R. A. Wood, chief of the photographic and drafting department, at the Pittsburgh Station, employs an excellent system and is meeting the innumerable requests for information with a dispatch and in a manner well known to the mining public.

The filing system in use in Mr. Wood's department is a modification of the "Dewey Decimal" system, which is in force at practically all libraries. As applied to the bureau, it covers everything, that is, it includes the filing of tracings, blue-

prints, maps, notes, photographs, negatives, lantern-slides, computations, charts, correspondence, etc. There is nothing in fact that cannot be accurately filed for quick reference under this system

While the scheme as followed by the bureau could be applied to any engineering department, yet it is too broad and covers more territory than would be desired by the ordinary engineering department. However, modifications of it would perhaps form a background for the best system of its kind that has been devised to date. It might be interesting to note some of the high lights in this system and how it could be modified to suit the needs of a mine engineering department.

In the lower right hand corner of each drawing is found the title. This bears a serial number, the first letter of which refers to the size of the drawing. Of these sizes there are five, as follows: A—10½ by 16 in., B—16 by 21 in., C—21 by 32 in., D—32 by 42 in., E—8 by 10½ in. The next figures in the serial number refer to the chronological order in which the drawing was made. For instance, a drawing with a serial number of C—223, indicates that the drawing is 21 by 32 in.



TYPE OF STEEL FILING CABINET USED

in size and was the 223rd drawing made at the bureau. The same scheme of numbers is applied to all maps and tracings.

All drawings of the above mentioned sizes are filed vertically in steel cabinets built by the Art Metal Fixtures Co., each of which has a capacity of 1,500. Blue-prints, maps and tracings are of course filed in separate steel cabinets, all of which are contained in a vault. As each drawing is completed in the drafting room, it is filed according to its size and the order in which it was completed as shown by the series number.

A photostat print is made of each drawing upon completion. These prints are made on letter size paper, and given to a file clerk along with a card containing complete information about the drawing. The clerk fills out a 4 by 6 in. index card—the standard size used at the bureau—filing it in accordance with the decimal number under whose head it comes. Something further will be said later regarding the decimal number. Each photostat negative that is considered sufficiently valuable to warrant retention is also filed.

The prints are filed in a leather and corduroy bound book

where they are classified by number, negative number and title. In referring to any drawing from the index card, the photostat print is usually looked up first. Often in consulting a drawing, the print answers all of the purposes that the drawing itself could offer, and considerable time is saved to say nothing of the avoidance of wear and tear on the drawing. However, the real purpose of making photostat prints is not that they may serve as any particular unit of the filing system, but rather that they may be included with reports that are submitted by bureau men in the field.

The method of handling the index cards is the same for all articles that are filed. The strict alphabetical listing of titles is not followed, this being entirely too cumbersome and necessitating the use of too many cards. The card index is kept separate for drawings, data and photographs. However, the right hand corner of the card contains the serial numbers of any other articles that may be related to the subject listed on the card. The following major divisions are followed as represented by the corresponding numbers:

- . 00—All data and material pertaining to the administration of the Bureau of Mines or of general use in its work.
- 0—Information of such a character that it may, with equal accuracy, be placed under the heading of any of the minerals that follow.
- 10—Coal, including lignite and peat.
 - 11—Production.
 - 12—Manufacture
 - 13—Utilization.
- 20—Oil, natural gas and liquid fuels.
- 30—Iron.
- 40—Copper.
- 50—Lead.
- 60—Zinc.
- 70—Silver.
- 80—Gold.
- 90—Rare metals.
- 100—Stone, clay, cement, etc.
- 110—Miscellaneous minerals.

The subdivisions as shown by second figures 11, 12 and 13 are applied to each mineral. Thus the production of oil would be found under 21 and so on. Everything is then filed under the head of the mineral to which it pertains.

A SUGGESTED VARIATION

A variation of the above major divisions might be easily applied to any engineering department. Some such scheme as the following might be installed to advantage:

- 00—All matter and data pertaining to the administration of the engineering department.
- 0—Information of such a character that it may, with equal accuracy, be placed under the heading of any of the mines that follow.
- 10—Any individual mine.
 - 11—Tipple.
 - 12—Sub-station.
 - 13—Fan-house.
 - 14—Boiler-house.
 - 15—Machine-shop.
 - 16—Etc.
 - 17—Etc., etc.
- 20—Any other individual mine.
- 30—Any still other individual mine, etc.

The divisions from 10 to 20 are of course appropriate for any of the other mines.

The actual working out of the system as applied with the index cards can best be shown in the following series of cards, relating to the filing of an individual photograph. (The same system would apply to the indexing of cards for any drawing, or other data that it was desired to keep on file.)

Fig. 1 shows the index card filed according to serial number. The name of the company is the title of the card. In parenthesis, a suggestion is made in a few words as to what the subject proper of the print is. The title of the print is shown in the central portion of the card, with the date on which the picture was made shown in the lower left hand corner. To the right of this is the photographer's name. The number of the

11.025 (11.032)	Negative No. 9157 Order No. 3845
Northwestern Improvement Co. (Log Stopping) Number 4 Mine Red Lodge, Mont.	
Flashlight of Log stopping used in Red Lodge Mines	
8-22-17	C. A. Allen

FIG. 1. CARD FILED BY SERIAL NUMBER

negative from which the print was made is placed in the upper right hand corner along with the order number used by the photographer. The figure 11 in the upper left-hand corner indicates that the print comes under the head of production in the major division of coal. The decimal portion of the figure indicates under what head of protection the print is classed. The card is filed alphabetically with respect to the name of the company at its head.

Fig. 2 shows the card with the same subject, but filed under the head of ventilation in the sub-division of Production. The name of the mine is used as the title of the card.

Fig. 3 represents the same print as filed under a geographic heading of the index cards. In this case the name of the town is the title of the card. This card is filed alphabetically along with all others containing the same decimal number, 11.025.

Fig. 4 represents the card as filed under the heading of underground equipment with respect to a particular classification under production.

In all four examples as illustrated above, the card titles are taken for alphabetical filing. If any tracing or drawing had

11.025	Negative No. 9157
NUMBER 4 MINE Northwestern Improvement Co. Red Lodge, Mont.	
Flashlight of log stopping used in Red Lodge Mines.	
8-22-17	C. A. Allen

FIG. 2. CARD FILED UNDER PRODUCTION

been made in connection with this photograph, the drawing number would be included on all four cards as well as the photostat number, and would be placed in the upper right-hand corner with the negative number. On the lower portion of the card along with the photographer's name would be included the name of the draftsman or designer.

In addition to the cards that are prepared as shown above, cards are indexed so that the serial number of drawings,

tracings and photostats can be ascertained, provided the geographical location is known. These cards are filed according to states and also alphabetically within each state, according to towns

Charts and papers containing test data are filed in the same manner as drawings and photographs. Lantern slides are

11.025	Negative No. 9157
RED LODGE, MONT. Northwestern Improvement Co. Number 4 Mine	
Flashlight of log stopping used in Red Lodge Mines.	
8-22-17	C. A. Allen

FIG. 3. INDEX CARD AS FILED GEOGRAPHICALLY

filed in a special metal case made by the Multiplex Fixtures Co., each having a capacity of 1,500 slides.

Drawers containing the index cards are stored in special steel safes. Over each drawer is pasted a label showing the variation of the numbers it contains. On one side of the safe is pasted a sheet with an index to the subjects covered by the decimal numbers found therein. Several copies of a loose-leaf book in which are shown the subjects covered by the serial numbers of the index cards are placed within easy reach of the workers in Mr. Wood's department. This book is kept up to date at all times.

It is questionable whether the making of photostat prints of all drawings could be advised for the average mine engineering department. Most companies do not require a map with any report that is made. The original expenditure for photostat apparatus would be practically the final one, however, as the making of prints could easily be done in conjunction with the making of blue-prints.

Another point to be considered in connection with the adoption of any system, is the waste of time that results from the

11.032	Negative No. 9157
NUMBER 4 MINE Northwestern Improvement Co. Red Lodge, Mont.	
Flashlight of log stopping used in Red Lodge Mines.	
8-22-17	C. A. Allen

FIG. 4. CARD AS FILED UNDER UNDERGROUND EQUIPMENT

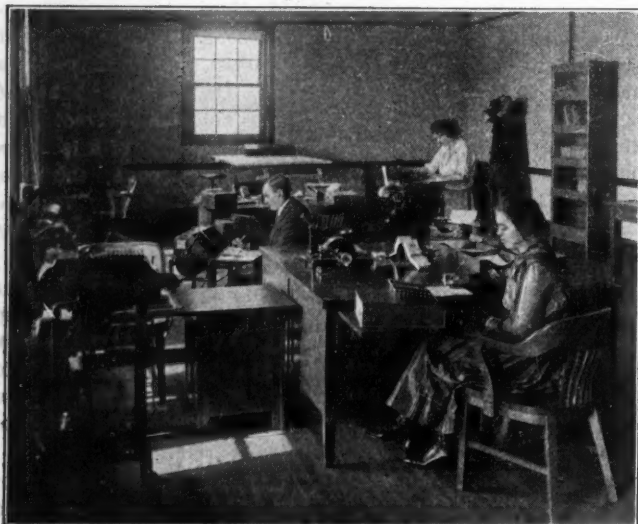
removal of a drawing from the files without a note having been left in its place stating the location of the drawing at the time of removal. This is a matter that frequently results in much confusion, which could be obviated by the clipping of a short note to the adjacent drawing in a vertical filing cabinet. In the pigeon-hole arrangement, there is even less excuse, for the

note can be directly placed in the compartment left vacant by the drawing

Notes, survey data, etc., should be filed in loose leaf books, on special forms in the case of the data. The forms as they are filled out should be given a series number to show the order in which the computations were made with respect to other pages, and filed accordingly. On the outside of the book, appropriate labels should be pasted to show the extent of the numbers in the book. Each sheet within the book would then be indexed by the cards in the card cabinet. This manner of filing notices is practically the same as that for drawings, as used at the bureau.

The beauty of the Dewey Decimal system is the ease with which it can be adapted to filing anything fileable. Correspondence can be filed by the same system. In fact, it is an excellent practice to file the correspondence of the engineering department by this method. The common practice of asking a correspondent to refer to a certain file number would automatically tie in all of the drawings, photographs and other data by the same number. This eliminates the necessity of searching through other files for information pertaining to the subject of the letter.

The installation of the decimal system involves a little more time than that required for other similar schemes and will



VIEW OF THE COMPUTING ROOM AT THE PITTSBURGH STATION OF THE BUREAU OF MINES

perhaps take part time of someone to keep it up, but the results are so far superior that it is well worth both the initial effort and the time involved later in keeping the system up. A man to operate the blue-print machine is a necessity. However, it is a rare occurrence that he is kept so busy that he could not find time to keep up the index cards of such a system. Mr. Wood, of the Bureau of Mines, estimates that half of one stenographer's time is employed in the writing of index cards. When the volume and variety of the articles covered are considered, the amount of time thus spent is comparatively small. Thus the amount of labor involved is not a serious problem. As most large coal companies employ file-clerks, it is quite possible that the handling of the engineering files could be accomplished as a side line entirely.

Another feature of this system is that the longer it is used, the greater becomes the ease with which an article may be filed. Each number in the serial stands for something concrete and the mention of any particular sequence of figures will bring to mind a particular subject. This is a big advantage over any system where the serial number merely represents a particular compartment that contains a drawing.

Velocity of Combustion

When other factors remain constant the velocity of combustion and the time of contact necessary for the completion of the reaction are closely related. The time of contact may be considered to be the length of time during which the combustible and the air supplied over fuel bed remain in the furnace. If the velocity is slow a long time of contact is required for complete combustion and a large combustion space must be provided in order that the gases may be burned before they pass out of the furnace and are cooled. The rate of burning the coal and the size of combustion space determine the length of time the gases remain in the furnace. As the size of combustion space with a given furnace setting is constant the time the gases remain in the furnace is proportional to the rate of combustion. With high rates of combustion a larger volume of gases is produced and a larger volume of air must be supplied to burn it than with low rates of combustion. The larger volume of the mixture passes through the combustion space more rapidly; therefore the length of time the mixture stays in the furnace or the time of contact is shorter. The combustion space should be large enough so that the gases and the oxygen in the air supplied remain in contact long enough to burn the gases completely when the furnace is operated at its maximum capacity.—*Bureau of Mines Bulletin No. 135.*

The Federal Trade Commission reports that the railroads of the United States in normal times take 25 per cent. of the coal produced each year; this means that they have been using 125 to 135 million tons of coal per year. It has been estimated that during 1916 and 1917 the demand for railroad fuel increased about 30 per cent. due chiefly to the extra mileage, to the wastefulness of the large number of old locomotives forced into service and to an increased demand for fuel needed for new locomotives. Thirty per cent. more per year called for at least 175 million tons of coal. The bulk of this increase was in bituminous coal, but in many cases anthracite was substituted.

The supply of fuel for the production of cement has been curtailed 25 per cent. by order of the Fuel Administration. If governmental requirements necessitate the manufacture of cement in excess of the 75 per cent. allotment, then provision is made whereby the manufacturers may produce it.

AN INDICATION of the tendency of present-day practice to conserve resources and enmesh development is the custom of burning bituminous fuel on many locomotives operating in the anthracite coal regions of Pennsylvania. The transportation problem is a serious matter. At least one-quarter of all the coal mined is used by the railroads to move freight in normal times. A movement to establish big steam-electric power plants at the coal mines has been agitated for years, and now it is receiving a new impetus. Similar plants are proposed at tidewater, and also connecting lines for transmission of electric current for the extensive electrification of railroads and the supplying of many industries with power.

The horsepower of a boiler may be taken in two ways. Either as a unit expressing the rate of work done in a certain time; or when it is the measure of the size and rating of the boiler.

Effective Means of Using Rescue Apparatus in the Fighting of Mine Fires*

By J. T. RYAN
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SYNOPSIS:—It is estimated that 90 per cent of the apparatus in use today, is for the purpose of controlling mine fires. The most effective means of using apparatus as well as the organization and equipment of rescue crews for fighting fires, are described in Mr. Ryan's paper.

SELF-CONTAINED oxygen breathing apparatus, most commonly termed rescue apparatus or helmets, was originally designed, developed and advertised as an equipment for use in rescue work following mine explosions. It was the possibility of saving life that brought about the development of the various types of equipment, because it was a popular idea to which the public was receptive, and it possessed great advertising possibilities. This feature was overdone to some extent, particularly in the early days of the introduction of breathing apparatus on this continent, for the reason that the apparatus was advertised as a panacea for all evils. The general public was under the impression that in the event of a mine explosion all that was necessary was to get a few men equipped with breathing apparatus on the job, who could immediately go underground, regardless of the condition of the mine, and explore every part, revive the injured miners with special apparatus which they were supposed to carry with them and bring them to the surface in good condition.

When it was discovered that these things could not be accomplished with the breathing apparatus a reaction set in, during which time the use and utility of self-contained breathing apparatus became the subject of research and study by scientists and men in the mining industry under the direction or guidance of the United States Bureau of Mines.

Among the many possibilities in connection with the use of mine rescue apparatus came the application of this apparatus to the efficient fighting of mine fires, so that at the present time 90 per cent. of the use of self-contained breathing apparatus around the mines is for the purpose of controlling mine fires, sealing them off or isolating them, and exploring fire areas that have been sealed in order to determine whether or not the fire is extinguished and whether it is safe to break the seals and ventilate the fire area. The apparatus is used to great advantage in exploration work following explosions, by having a crew equipped with the apparatus explore in advance of the crew, restoring ventilation to discover any incipient fires that may have been caused by the explosion and to extinguish and isolate them before ventilation is established in that section, thus preventing a second explosion.

It is gratifying to note that during the past five years there has been a great reduction in mine explosions in this country, due to the safety measures employed, such as the general use of electric safety cap lamps, permissible explosives, rock dusting, humidifying the air, watering the dust, and more rigid inspection for gas and other dangers.

Mine Fires Not Confined to Coal Mines

Unfortunately, however, there is no apparent reduction in the number of mine fires, and while explosions occur mostly in coal mines, mine fires are common to all classes of mines, so that the subject of fighting mine fires should be of interest to every man connected with the mining industry. I would like to emphasize the fact that a fire hazard exists in every

mine, and therefore careful study and attention should be given this subject by mining men with a view of anticipating and eliminating some of the more common causes of mine fires.

The Old Method of Fighting Mine Fires

Since mine fires have always occurred in the industry, they had to be combated in some manner long before breathing apparatus was heard of. The common method employed was, of course, to get to the seat of the fire before it had attained much headway and extinguish it by use of water or chemicals, or by loading out the burning material. If the fire had attained such headway that it was impossible to do this, then it had to be sealed off or flooded. This work was done by men without any protection and required great courage, energy and judgment, and in districts where mine fires were prevalent it developed a class of men who are usually called upon in case of fires to take charge of the work. There was also developed a few of the type commonly known as "fire-eaters," men who possessed great moral and physical courage, but who were lacking in judgment, and some of whom believed that they were immune to the effects of gases produced by the fire and that they could walk right into the seat of a blaze and literally eat it up. Very often these men led crews, consisting mainly of men having knowledge of the mine, into the fire zone and the whole party would be overcome or be affected by carbon monoxide gas to such an extent that they would not be available for further service for some time, which of course would retard the work, due to the fact that the men having knowledge of the mine and who should have been directing the work were out of commission.

Modern Method of Fighting Mine Fires

The same general method of fighting mine fires is employed today as formerly, with the exception that rescue apparatus is now very generally utilized in connection with the work. Unfortunately, it is seldom on hand or readily available at the mine where the fire occurs, and this is the time when it can be used to the greatest advantage, because frequently the fire is discovered in time to permit men without protection to get close enough to the fire, but they are unable to do effective work or stay long enough to extinguish the fire. Hence they are unable to seal it off near the origin on account of the smoke and gases, and they either have to drop back a considerable distance with their seals or await the arrival of men equipped with breathing apparatus.

Effective Means of Using Breathing Apparatus

No work can be done successfully without proper organization. This certainly applies to the use of mine-rescue apparatus in connection with fighting mine fires. An organization in this case is twofold: First: the proper organization of the rescue crew, and second, the organization of the work. Unless your rescue work is organized to the extent that the apparatus is rigidly inspected and tested at least once a month (preferably once a week), and men properly trained and certified by some competent authority, and training periods continued at regular intervals, then you do not maintain a real rescue equipment. You are only laboring under a false sense of security, and certainly if you see the need of such an equipment to the extent that you have gone to the expense of installing it, you should see that the work is properly carried out so far as keeping the equipment in condition

*Paper read before the Mining Section of the National Safety Council, Cleveland Meeting, Oct. 3.

and your men properly instructed and trained. This requires only a small additional expense and assures you of a full degree of efficiency when an emergency arises which calls for the immediate use of your equipment. When the emergency arises, it is then too late to order material, to put your apparatus in proper working condition, or to train your men, and it is unwise as well as dangerous to send a rescue crew not properly trained into a mine to fight a mine fire, or with apparatus not in good condition or properly inspected.

All Concerned Should Know the Apparatus

The second phase of organization in connection with the use of rescue apparatus in fighting mine fires is the general organization of the work of which the rescue squad is an integral part. Some recognized authority must be in charge of the entire operation. The one invested with this authority should be a man of courage, possessing good judgment, a cool head, having had previous experience in fighting mine fires, and training in breathing apparatus. Regardless of how much experience a man may have had in fighting mine fires, if he has not taken the trouble to acquaint himself with breathing apparatus so as to realize its advantages and limitations in connection with fighting mine fires, he lacks progressiveness and is not competent to conduct this work efficiently, providing rescue apparatus is to be used in the operations. Fortunately, most up-to-date mining men have this knowledge today and are competent to direct this work. When the rescue squad knows that the man who is directing the work is familiar with their phase of the work and will not ask them to go where he himself would not go if he were wearing the apparatus, then the work will be carried out with dispatch.

Value of a Well Organized Crew

The rescue squad should be composed of men familiar with the mine. Therefore, every mine should have at least ten of its men trained in the use of self-contained breathing apparatus. If the mine where the fire occurs is equipped with breathing apparatus and a properly organized rescue crew in charge of a competent man familiar with the mine, they can get on the job in a short time, depending upon their own emergency organization, and in most cases can control the fire before it reaches serious proportions.

Procedure at a Mine Not Equipped with Rescue Apparatus

If a mine is not equipped with breathing apparatus and the fire gets beyond the control of the local officials, a rescue crew is called from the outside. The first thing they should do upon arriving at the mine is to test out their apparatus and see that it is properly charged and in good working order. The captain should supervise this work.

While the crew is engaged in this work the man in charge should confer with the officials in charge of the mine and familiarize himself with the workings by consulting the mine map or model and ascertain the probable location of the fire and what has been accomplished previous to his arrival.

If men are in the mine and it is not definitely known that they are dead, the first thing to do is to endeavor to reach them. This may necessitate controlling the fire temporarily or changing the ventilation to permit the apparatus crews to penetrate the workings to the points where the men are most likely to be. This work usually requires the use of apparatus and should be done without delay.

If men are known to be in the mine never assume that they are dead. If it is definitely known that no live men are in the mine the problem resolves itself into controlling the fire and protecting the men who are doing this work.

Procedure of the Rescue Crew

Before sending a rescue crew underground clear instructions should be given the captain as to where and approximately how far they should go and what they should attempt to do. Unless the captain is thoroughly familiar with the mine the route should be marked on a blueprint which the

captain should take with him. Even though the crew is familiar with the mine a blueprint should be taken along.

As soon as possible a fresh air base should be established as near to the irrespirable zone or zones as safety permits, and preferably near a telephone. Temporary telephone communications should be established with the outside as soon as possible. Whenever a rescue crew works beyond this base there should be stationed there a fully equipped reserve crew ready for immediate service, one or two light or short period apparatus or carbon monoxide gas masks, stretchers, canaries, blankets and first-aid material. As soon as possible the necessary tools and material for erecting temporary brattices should be advanced to this point.

If the first crew is able to complete its exploration to the limit of safety without reaching the fire zone, they should return and report conditions; and then steps should be taken to move the fresh air base nearer to the fire area. This work usually requires some use of the apparatus crews. The same procedure is then continued until the fire area can be reached by the apparatus crews. However, in coal mine fires this procedure must be conducted with great caution, particularly in gaseous mines. The return air should be tested at frequent intervals by a Burrell gas indicator (a safety lamp is not sensitive enough), and when the methane (CH_4) content increases to a certain point previously decided upon as the allowable limit, further advance should be discontinued in that direction and seals constructed, or some other plan of attack outlined. If the rescue crews are able to establish a fresh air base near the fire area, they can then proceed to extinguish the fire by the best method conditions will permit or seal it off in the smallest possible area consistent with safety.

Equipment of Mine Rescue Crews

A rescue crew should consist of five properly trained men in good physical condition equipped with rescue apparatus capable of providing the wearer with breathable air for a minimum of two hours of maximum exertion. Each man should be equipped with an approved electric cap lamp or flashlight, preferably the former, as it is carried on the head.

The captain, who should be in the lead, should carry a canary or carbon monoxide detector, or both, and a pick-handle for testing roof or feeling the way in smoke. The second man should carry a flame safety lamp to detect explosive gas or oxygen deficiency. The third and fourth man should carry a stretcher and half-hour apparatus or carbon monoxide mask. The fifth and rear man should have a supply of white chalk and should, where the atmosphere is clear, indicate the route by means of arrow marks pointing outby.

If the crew is going to enter a smoke atmosphere a life line should by all means be carried in and each member should take hold of it, at even intervals of 6 ft. wherever practicable. A competent man should be in charge of the reel at the fresh air base. The life line serves as a means of preventing members of the crew from becoming separated, as a marker for the return journey, and provides a means of signaling to the fresh air base.

The geophone, a listening device developed during the war for detecting and locating underground mining, has great possibilities in connection with locating fires or entombed men, and should now be a part of a rescue crew equipment as the device is light and compact. This device, along with the carbon monoxide detector and carbon monoxide gas mask, is a war development which has possibilities in connection with the fighting of underground fires.

Effective Use of Rescue Apparatus

In 1915 a serious fire in a coal mine in Utah operating in a 20-ft. seam was extinguished solely through the use of rescue apparatus, 24 sets of which were used continuously for a period of 41 days. This fire threatened to destroy property worth millions of dollars, as it was impossible to seal the fire.

A large coal mine in West Virginia operating over an ex-

tensive property suffered a severe explosion in 1916. As the result of two subsequent explosions caused by fire resulting from the first explosion the mine had to be sealed at the top of the shafts. One or two unsuccessful attempts were made to reopen the mine, and it was finally opened and recovered through the use of rescue apparatus, 18 sets being used continuously by day and night crews for a period of seven months in completing this operation.

A few months ago a slope mine in Western Pennsylvania had a fire near the mouth of the mine, six men being in the mine at the time, four of them being about two miles from the mouth. All six men were recovered alive through the use of rescue apparatus. It was necessary to attach the rescue apparatus on four of these men as they were recovered and revived in fresh air but had to be brought through a 4,000-ft. zone of irrespirable atmosphere to get them to the outside.

Metal mine fires and coal mine fires each present their own peculiar problems. The metal mine fires are as a rule more difficult to reach, harder to control, and generate more carbon dioxide and sulphur dioxide gases. Coal mine fires are more dangerous to handle on account of the ever present danger of an explosion.

In either case fighting them is a hazardous job. Yes, the most hazardous work incident to mining, and the men who put on breathing apparatus and enter an irrespirable atmosphere to extinguish fires when no lives are at stake are the finest examples of the strong courageous men that the mining industry has developed.

Wellman Geared Bucket

Throughout the entire field of handling bulk materials, such as coal, sand, gravel and cinders, the use of clam-shell buckets has been attended by expense and serious delays necessitated by the renewal of operating cables or chains.

The ordinary construction of a clam-shell bucket is such that a large quantity of the material handled comes in contact with the operating parts of the bucket. The inevitable result is excessive wear of those parts, because of the abrasive action of the material, and consequent delay and expense in removing and renewing the worn portions.

With the idea of eliminating these faults, The Wellman-Seaver-Morgan Co. has developed a bucket, built in accordance with well recognized mechanical principles, possessing highly efficient digging qualities, requiring minimum headroom, and possessing a low center of gravity, combined with neat appearance and durability.

All of the working parts are completely inclosed in a tight casing where they are constantly lubricated and where they do not come in contact with the material handled.

The bucket is composed of a minimum number of parts, so arranged as to facilitate the removal of any part in case of necessary repairs. It has no expensive chains or ropes reeved on small sheaves, no complicated parts or difficult adjustments. It is therefore simple, compact and efficient.

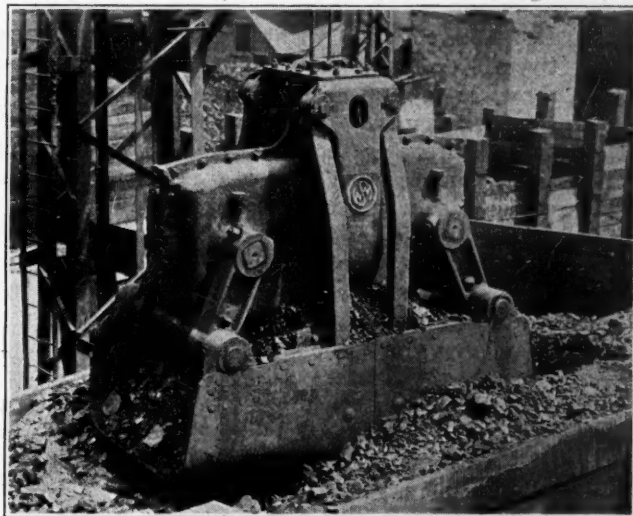
This bucket is especially designed for handling coal, sand, gravel and cinders. It is operated by two ropes and consequently can be handled by practically any type of two-drum hoist. Departing from the usual design of grab buckets, which employ ropes or chains for their operation, this bucket has completely inclosed gearing to produce the necessary digging power.

The casing, which forms the main frame of the bucket, and from which the shells are suspended, is divided in a vertical plane through its longitudinal center-line. These two sections are bolted together to form two tight compartments inclosing the operating gears, with a third compartment in the center for the power wheel and the deflecting sheaves for the operating ropes.

The power wheel center is integral with the two bevel pinions which extend into the gear compartments and mesh with

the operating segments. These segments are keyed to the operating shafts, which are supported in bearings cast in the casing. The outer end of the operating shafts are finished square and support the rear bucket arms, which in turn are connected to the shell shafts. The cutting edges of the shells are pin-connected to the side bars, suspended from lugs cast in the top part of the casing. This method of supporting the shells produces a flat cutting path and turns the shells in such a manner that, in penetrating the material, only the thin edge of the shell is presented, resulting in a high digging efficiency.

The wide opening of the shells enables the bucket to fill in material which would otherwise be too shallow. The shells are open at the back to prevent compression of the material when the bucket is closing.



VIEW OF BUCKET SHOWING CASING

The rigid connection of the rear arms to the operating shafts and to the shell shafts insures positive alignment of the shells; and side lash is further prevented by side bar guides attached to the shells. It is important, when handling fine, dry materials, that the shells shall register accurately when the bucket is closed.

As the operating gears are completely inclosed by the casing, it is impossible for them to come into contact with the material the bucket is handling. On this account complete lubrication is possible and the wear of the parts is reduced to a minimum; at the same time the efficiency is materially increased.

A power wheel being directly connected to the pinions, the digging effort is the same from the beginning to the end of the closing operation. The opening of the bucket is effected by an opening rope attached to the small section of the power wheel, and wound in the opposite direction from the closing rope. In this way the bucket is opened by power, quickly and completely. On account of the small diameter of the closing pinions the bucket requires only a small amount of rope either for opening or closing, and is capable of high speed of operation.

The bucket is compact in design, requiring a minimum amount of headroom for its operation. When open, only a small part of the casing extends above the shells, resulting in remarkable stability on the pile and little tendency to upset.

Failure to act promptly after an explosion or mine fire has often resulted in the needless loss of many lives, especially in the case of fires that at first did not seem to be dangerous. Also, after an explosion unnecessary delay in exploring the near-by entrances to the mine has resulted in the death of miners.—*Rescue and Recovery Operations in Mines.*

Storage-Battery Locomotives in Mine Work

Early storage-battery mine locomotives offered to the coal industry were not properly proportioned to withstand the severe usage to which all such machines are subjected. These difficulties have been overcome, and machines of rugged construction and ample capacity are now obtainable. If one of these locomotives is cared for as carefully as are mules, they will give long and efficient service

BY JOSEPH APPLETON
Ironton, Ohio

RESULTS obtained with storage-battery locomotives in coal-mine service during the last two or three years have been so uniformly successful where properly applied that today the storage-battery locomotive is probably receiving more prospective attention and consideration than any other piece of machinery connected with coal-mine operation.

This being the case, I will relate briefly the past history and present status of the storage-battery locomotive, showing why the early installations were not so successful as they might have been, what developments have been made, and why during the last two or three years they have been so extensively used and with such uniformly satisfactory results where the proper methods of purchase and installation have been followed. It will also be well to look into the future to discover what lies in store for the coal-mining operators through the use of this type of machine.

Unfortunately, it must be admitted that there were many failures in the early days. This can be attributed to the fact that the locomotives in question were not constructed along practical lines and were not at all suited for the conditions under which they had to work. At that time (and even today in some cases) the machines have been too much the product of draftsmen and designing engineers who did not have a sound basis for their plans or practical experience in or knowledge of the coal mines. The result was a piece of machinery unsuited for the work.

BEST BATTERY LOCOMOTIVES THE RESULT OF LONG YEARS OF PRACTICAL EXPERIENCE

The best storage-battery locomotives on the market today are those that have been developed from the practical knowledge and hard-earned experience of mining men combined with good mechanical and electrical talent. The result is a rugged, simple piece of machinery that is not out of place in a coal mine but fits in well with the rest of the equipment.

Alongside of the unsuitable design and construction in the earlier types there was another good reason for their unsatisfactory performance, and that was because the locomotives were installed without proper knowledge and investigation of the conditions and the amount of work to be performed. Either they would not perform the work expected of them or more often they would not perform it for a full day's time. This caused mining men to look upon them as unreliable and even as a nuisance.

*Paper presented before the Kentucky Mining Institute, Lexington, Ky., June 7, 1919.

Again, as is always the case, the failures were heard of and heralded abroad, whereas the successful installations kept on quietly working and making good without being much noticed outside the mine in which they were operating.

The storage battery, which is the vital power-giving portion of the locomotive, was not at first built to withstand the conditions met with in mining service. Furthermore, being something strange and looked upon as more or less of a mystery, it was never understood and therefore did not receive the little attention it required.

Today the story is different, and if care is taken in the selection and purchase of a storage-battery locomotive, it is possible to obtain a machine which is truly the result of mining experience combined with good engineering and electrical design equipped with a battery specially built for mine use and having ample capacity to give uninterrupted daily service for a length of time which makes it commercially successful and profitable. Today it is not a question of such a locomotive being a success or otherwise, but whether or not the conditions are suitable for storage-battery locomotive operation.

STORAGE-BATTERY LOCOMOTIVES NOT SUITABLE FOR ALL CONDITIONS

It should be emphasized that storage-battery locomotives are not suited for all mining conditions, and it is important to ascertain from those competent to decide whether the use of a storage battery is warranted.

The leading manufacturers of storage-battery locomotives today will not sell or install a machine of this kind unless they know it is going to be a success both from an operating and financial standpoint. I would suggest as a protection to those installing such locomotives that they include in their contract a duty cycle showing clearly just what work the machine will have to do and for how long the work has to be done each day on one full charge of the battery.

Let us consider what are the requirements of a successful storage-battery locomotive and why a properly designed and constructed machine of this type will perform more cheaply and efficiently the work of gathering and hauling coal under average conditions than any other method.

I can safely say that under nearly all conditions of gathering the storage-battery locomotive is without equal when it comes to quick work and low cost of operation. Except in special cases, coal can be gathered much cheaper with these machines than with mules or with cable-and-reel locomotives. When it comes to the

question of hauling the coal from the parting to the tippie or shaft bottom, another problem is encountered which will have to be considered in each case on its individual merits.

The storage-battery locomotive is not suitable where the haul is too long, or where steep grades are maintained for too great a distance. It has its own field, and it is hardly possible that it will ever compete with or replace the trolley locomotive on main-line hauls over considerable distances.

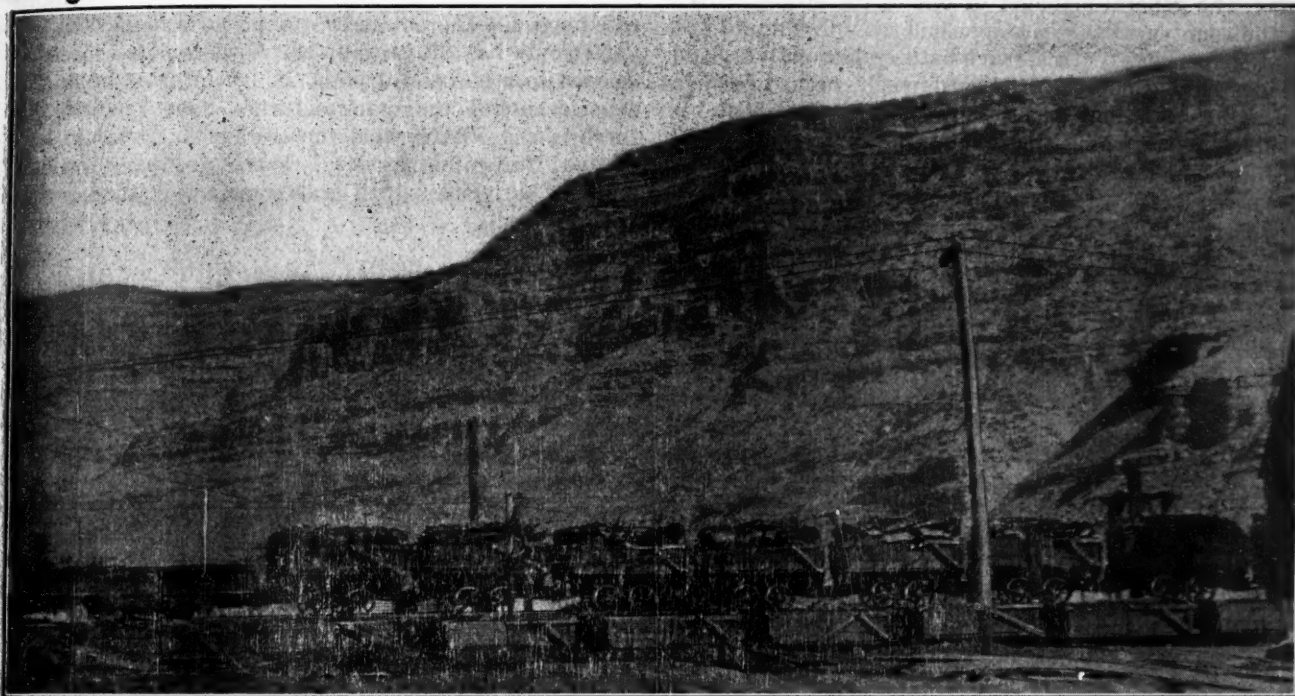
For gathering coal we want a locomotive that will handle the cars quickly, get them to the parting in the shortest time so that the car turnover may be as great as possible, and place the empties up to the face so that the loaders may load coal continuously without interruption for pushing or placing the cars.

A storage-battery locomotive is ideal for this work. It is independent of any external source of power, is

done for mules, frequently amounts to enough to pay for the locomotive in a reasonable time.

In gathering with a reel-and-cable locomotive, no matter how carefully operated, the cable is often run over and cut, necessitating an interruption and delay to splice and reinsulate it. All this costs money besides keeping down coal production. There is also the danger of starting a fire from the short-circuit and arc when the cable is parted.

Have you ever figured out just what the cost per annum is for cable for such machines? I have had figures given me from actual records which are surprisingly large. All of this can be done away with and avoided if storage-battery locomotives are used. Furthermore, better time can be made. Ask the men who have operated both storage-battery and reel-and-cable machines which is the easiest to handle and which will give the most continuous service and gather most coal.



STORAGE-BATTERY LOCOMOTIVES ARE USED BY THE GRAND JUNCTION MINING AND FUEL CO. AT GRAND JUNCTION, COLO.

easily handled, has quick acceleration (both running light and under load) and will go into rooms and entries where mules or cable-and-reel locomotives cannot be operated on account of the height.

No feeders, trolley wire or track bonding is required and, if desired, the machine will operate successfully on wooden rails in the rooms. For low coal it is built in small sizes only 28 or 29 in. above the rails, and in larger sizes 32 to 33 in. above the rails. In fact, wherever a man can work, this locomotive can follow him.

A storage-battery locomotive must be easily returned to the track if derailed or wrecked, and there are machines built today with special features of flexibility to enable them to stay on the track even though this is uneven and irregular.

The fact that a storage-battery locomotive can be operated on cross and butt entries without trolley wires or track bonding is in itself a big argument in its favor on account of the saving in investment and upkeep. Furthermore, the saving in taking down top or lifting bottom in low coal, as must in many cases be

The coal industry is facing a shortage of labor that looks as if it were going to be serious. The storage-battery locomotive is a great labor saver. Its use releases the men otherwise employed as mule drivers to the loading of coal, while the time of the loaders which is taken up in placing the cars at the room face can also be devoted to loading.

It is impossible to state generally how many mules and drivers can be replaced by one storage-battery locomotive. This depends entirely on conditions and arrangement of the work. I have known a 5-ton locomotive to replace seven mules and five drivers, although this was an exceptional case. Three to five mules is a fair average.

In connection with the question of comparative costs of the storage-battery-locomotive operation with other methods, it must be understood that it is only by careful investigation of the conditions in each case that this can be figured out. No general figures will apply to all cases. The company I am connected with insists on making a personal investigation of all the conditions

before recommending for or against the use of storage-battery locomotives, having found that this is the only way to put before the mine operator a reliable statement as to what saving he can make if he uses storage-battery machines. Of course, after the first locomotive is placed in operation in a mine it is easy to figure out by direct comparison what can be accomplished by adding others.

Today it is possible to show a prospective customer storage-battery locomotives operating in some mine in almost every territory, under conditions quite similar to his own. And after all, this is the most convincing argument that can be furnished. Results are what count, and a personal investigation of what one of these machines is doing in another mine and a few minutes' conversation with those who own or operate it is far more convincing than an elaborate report.

Only a few weeks ago I had a remarkable instance of this. The general manager of one of the largest mines in the country some years ago had an unfortunate and costly experience with storage-battery locomotives; and besides having no use for them himself, he had been in the habit of telling his brother operators all about his troubles and warning them not to have anything to do with such machines.

We knew that this man could use storage-battery locomotives to advantage and kept right after him. It took a great deal of persuasion to get him even to investigate what was now being done with such machines, but finally friendship and persistency won the day and we showed him some up-to-date operations under conditions similar to his own. I might truly say that some of Billy Sunday's wonderful and estimable experiences with unbelievers appear quite insignificant beside the change of heart in this general manager. His is not an isolated or uncommon case.

STORAGE-BATTERY MACHINES OPERATE AT MAXIMUM EFFICIENCY AS THEY CARRY OWN SOURCE OF POWER

A storage-battery locomotive carrying its own source of power is always operating under the best possible conditions. This makes it possible to design the entire locomotive both mechanically and electrically along decidedly different lines from those of the trolley locomotive. This is also necessary to secure the maximum results from the energy stored in the battery. This is not generally realized or appreciated, there being one point in particular which is brought up when considering storage-battery versus trolley locomotives, and that is the size of the motor or motors employed.

I have frequently heard the argument that the storage-battery locomotive cannot be as satisfactory and reliable as the trolley machine because it had a much smaller motor capacity per ton of weight than the trolley type, and therefore becomes more or less of a toy as compared with the trolley.

It is certainly true that the motor or motors on a storage-battery locomotive are much smaller per ton weight of machine than in a trolley type, but it is just as true that they should be so because of the different conditions, for example:

A storage-battery locomotive carrying its own source of power is always operating at full normal voltage for which the machine is designed. Consequently, the motor itself is much more efficient than is the trolley type of machine, in which the motor has to operate frequently on as low as one-half the normal potential.

I have seen the voltage on a trolley motor, normally operating at 250 volts, as low as 105 volts when a long distance within the mine and away from the power plant or source of supply. When the voltage at the motor terminals drops to one-half normal the current must be doubled or even more in order to obtain the same output in horsepower. Consider the design of motor necessary for these conditions.

A storage-battery machine does not have to operate at the same speed as a trolley locomotive—and speed means power. In every kind of propulsion a given increase in speed requires an addition in power consumption far in excess of the speed increase. Speed is not required in the large majority of situations which are suitable for storage-battery-locomotive operation, and while it may appear a fallacy, yet in gathering, making up trips and similar work, the storage-battery machine with its slower maximum speed will perform more work in a given time than the trolley type with its higher rated speed. The power consumption is much less.

Not only has the storage-battery locomotive been developed to a successful point along the lines of mining experience but the manufacturers have realized that there is a profitable field for storage batteries in locomotives for mine service. There are now available storage batteries which are commercial successes in this service.

SUCCESSFUL STORAGE-BATTERY MACHINE MUST BE SO CONSTRUCTED AS TO WITHSTAND ROUGH USAGE

It is necessary for the battery in mine locomotive service to be rugged, have a long life, and perhaps the most important of all to be assembled and arranged in the locomotive in such a manner as to withstand the bumps and knocks incident to this service. The earlier storage batteries were built along the lines of the electric vehicle batteries in which service they can receive regular attention at a garage and furthermore do not have the rough usage which is a necessary part of mine service. Consequently, the batteries were assembled too light—separators not durable enough, rubber jars too light and fragile, and the trays or crates in which the cells were assembled anything but suitable for the strenuous service in mines.

Today mine locomotive batteries are built and assembled in such a way as to withstand successfully the rough handling they are certain to receive. The rubber jars are made of a better and more durable compound besides having thicker walls, and the manufacturers are willing to guarantee both jars and separators in addition to the battery elements themselves.

Speaking from an electrical viewpoint, the work done by the accumulator in locomotive service is not hard, not nearly so hard in fact as in many other applications.

LARGE NUMBER OF STORAGE-BATTERY MACHINES IN DAILY USE AND GIVING GOOD SERVICE

Hundreds of thousands of storage batteries are in daily use performing exactly the same function in connection with the starting and lighting system on automobiles as is done in a locomotive except with this difference—the small box of batteries on a gasoline car is called upon to do many times the amount of work for its weight and size that any locomotive battery can possibly do.

Those who have cranked a gas car that has high compression know that it requires some energy, yet all the

energy required to do this work is obtained from a little box of batteries which is just about the same weight and size as a single cell in a locomotive battery; and there are about 40 to 48 cells in a storage-battery locomotive.

I mention this to show that the problem involved is only that of building a storage battery suitable for the work and service in a locomotive. This is not difficult if ample capacity is provided. Since batteries in this service are rapidly becoming better understood, longer life and better results as to cost of operating are being obtained.

The accumulator, as I said before, is the vital power-giving portion of the locomotive and, being something entirely different from any other mechanical or electrical device, it has been misunderstood and looked upon more or less as a mystery. The consequence was it was neglected and allowed to starve itself into a condition of weakness and unreliability through nothing but want of ordinary care and attention. The way in which a storage battery performs its function of storing up electrical energy and giving it out again when called upon is not generally understood. If it were, I believe the mystery attendant upon it would be dispelled.

It is somewhat of a misnomer to say that a storage battery stores up electricity—it does, but in an indirect way through chemical action which is brought about by the passage of an electric current through the cells. An accumulator cell consists of the following parts: The metal plates in which the chemical action takes place, the separators to keep the positive and negative plates apart, the liquid solution which acts as a conductor between the plates and also as a reagent, and the containing cell.

As a current of electricity is passed through the cell, the water in the solution is split up by electrolysis into its component parts—hydrogen and oxygen. The oxygen is absorbed by the positive and the hydrogen by the negative plates, creating a chemical action and change in them. This process of chemical action goes on until the plates cannot absorb any more of the gases or have become fully charged.

If charging is continued to any great extent beyond this point, the gases are given off freely in the form of bubbles and the cell heats up, which is injurious and shortens the life of the cell. This is the danger of overcharging. When the battery is called upon to furnish current or discharge, the chemical action is reversed and the plates are again brought gradually to the condition where they can again absorb the hydrogen and oxygen gases or to a point of discharge.

This is only to give an idea of how the electricity is stored up in a battery. There are chemical changes in the material in the plates and also in the solution, but we need not consider this here.

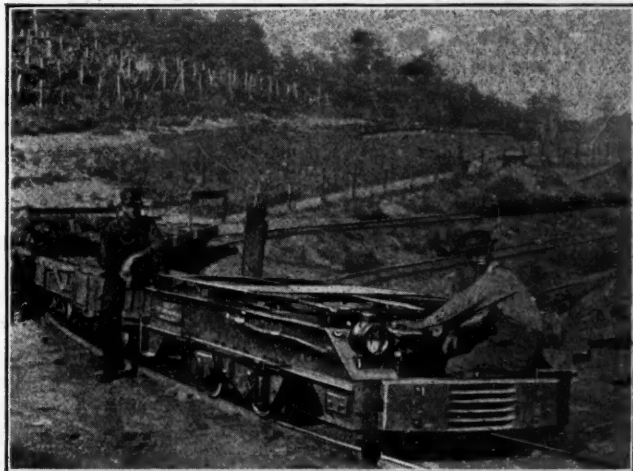
The cycle of chemical action and reaction may be repeated for a long time and is just as sure and certain as the setting and rising of the sun, provided the cells are kept in condition to permit this action to take place. By keeping in condition, I mean the adding of distilled water to replace evaporation and maintaining the cells clean and free from foreign materials and impurities.

There are two types of storage batteries available today for this service—the lead battery, which has been the longest on the market, and the Edison battery, which is a more recent development and which on account of its radically different construction makes it ex-

tremely rugged and well suited for this service. In the lead battery the elements are composed of plates built up of lead and lead oxide, the liquid solution being dilute sulphuric acid. Wood and rubber separators are used to insulate the positive and negative plates. This whole combination is placed in a containing jar of hard rubber. On account of the sulphuric acid solution, acid-proof construction must be employed, hence the necessity for the hard-rubber containing cells.

This feature has been looked upon as introducing an element of weakness and trouble from the acid, but as I stated before modern construction has helped this greatly.

The Edison battery uses nickel and iron in the construction of the battery plates with an alkaline or potash solution. This enables a cell to be built which is rugged and long-lived, and having no acid solution a steel containing can is employed. The action of charge and discharge in a battery of this kind is, generally speaking, along the same lines as in the lead cell, but owing to the material used the battery is more rugged and less likely to be injured by abuse. Since it utilizes metallic construction in the containing cell, it is less liable to accident through breakage in wrecks, etc. The



LOCOMOTIVE USED BY THE J. A. ESSER COAL AND COKE CO., ESSERVILLE, VA.

price of the Edison battery is higher than that of the lead, but the life is much longer and the extremely rugged and foolproof construction insures a continuity of service which is of great importance.

As the battery situation stands today, both lead and Edison are an entire success commercially. The question of first cost is usually the deciding factor as to which shall be selected, and a good plan is to investigate both types and get the recommendations of the locomotive manufacturer, who is naturally vitally interested in furnishing the battery equipment that will give the best results in his locomotive.

The lead-battery manufacturers guarantee the life of their batteries in this service for 18 to 21 months, according to the type of battery, while the Edison battery company gives a schedule of prices for replacements ranging over a period of ten years, so that it is possible for the user of storage-battery locomotives to predetermine closely what the annual expense will be for battery upkeep based on the guarantees furnished by the manufacturers.

Of course, the maximum cost of upkeep is calculated

in this manner, and if by careful operation and handling the guaranteed life of the battery is exceeded, the annual expense is reduced accordingly. All battery manufacturers maintain service departments that make periodic inspections of the batteries in service and are available if anything occurs requiring their attention.

As the utility of the storage-battery locomotive in mine service has been recognized, great improvements have been made in the charging apparatus. In the earlier days, sufficient attention was not given to this point with the result that cheap and inferior apparatus was used in order to keep down the first cost; but the fallacy of this practice has been recognized and there is not now the hesitancy that formerly existed toward making a reasonable investment for this part of the equipment. The result is a good return on the additional expense in the shape of longer battery life and 100 per cent. satisfactory operation of the locomotive at lower cost with greater reliability.

There are two general methods of charging locomotive batteries in coal mines. The one most frequently used in the past has been to take current from the 250-volt, direct-current line which furnishes power to the coal-cutting machines, trolley circuit, hoists, fans, pumps, etc. The charging of the battery from this source is done through a rheostat which reduces the current to the proper voltage for the accumulator.

This method is entirely practical provided good automatic instruments are included on the charging rheostat panel; but these automatic features always require inspection and care, and if they fail to operate through lack of attention the battery is liable to be overcharged.

The other method is to install a small motor-generator set for charging the battery or batteries, taking current preferably from the alternating-current supply where power is purchased or the main generator if the mine has its own power plant. With a motor-generator set of this description the proper charging of the battery is not dependent on any automatic features and is as nearly foolproof as it is possible to make it. The battery cannot be overcharged and moreover is charged with the smallest possible consumption of electric power.

METHOD OF CHARGING ADDS TO OR DETRACTS FROM THE LIFE OF THE BATTERY

Batteries charged from motor-generator sets invariably have a longer life than those charged from rheostat panels. This is particularly noticeable with lead batteries, which are more susceptible to overcharge, and the extra investment required for the motor-generator set is much more than offset by the longer life obtained from the battery. It is advisable to give careful consideration to the latest developments in charging equipment.

There has recently been developed and put on the market a new type of combination storage-battery and trolley locomotive which is a distinct and marked advance over the old types. This will, I feel sure, fill a long-felt want and also increase the scope of usefulness of the storage-battery locomotive.

The original combination locomotives were simply a trolley machine with a small auxiliary storage battery which was used when no trolley wire was available. The battery was very small—not large enough to give real service as a storage locomotive, and was liable to be seriously overcharged or overdischarged on account

of its limited capacity. Only by extremely careful and skilled attention could the combination locomotives be operated really successfully.

The new type of combination locomotive to which I refer is built on different lines. It has as much battery as the straight storage-battery machine. In fact, it has the same standard equipment but has an auxiliary charging attachment, so that current may be taken from the trolley wire wherever possible. This current is used to run the locomotive or charge the battery, or both, according to the amount of work the machine is doing at the time.

The current taken from the trolley wire is a fixed amount of all times, say, for example, 80 amp. If the locomotive requires this amount or less than, say 60 amp., the difference of 20 amp. charges the battery while the locomotive is running. If the load is heavier and requires more current than the 80 amp. coming from the trolley wire, say, for example, 140 amp., 60 amp. is taken from the battery and assists the current coming from the trolley to operate the motor.

If the locomotive is not running, the entire 80 amp. coming from the trolley wire goes into the battery. The amount of current allowed to flow from the trolley can be fixed at any desired point up to 100 amp. according to the condition of the work in the particular section of the mine and the length of time the locomotive will operate on the trolley. This arrangement is wonderfully flexible and gives many advantages, as follows:

SOME OF THE ADVANTAGES THAT ACCRUE IN THE OPERATION OF STORAGE-BATTERY MACHINES

The locomotive can do the regular work of a straight storage-battery machine but can cover a much larger area than is possible with the strictly storage-battery locomotive, because the battery is recharged during the day's run. While running on the trolley, the work on the battery is reduced, conserving the battery capacity for work where there is no trolley wire.

If the locomotive is standing idle between trips, the battery can be charged from the trolley and the length of time required to fully charge it at the end of the day's run is reduced. There is no danger of injuring the battery, because it is of ample size and the amount of current that is taken from the trolley at any time is predetermined and fixed according to the conditions existing.

This combination locomotive bridges a wide gap between strictly storage-battery and trolley locomotives and has a wonderful field of usefulness. In fact, it makes storage-battery locomotives practical and available in situations where the length of haul would be too much for a machine of this type, and yet enables its good features to be retained with the further advantage of extending its scope of operation by the auxiliary trolley attachment.

USE OF STORAGE-BATTERY LOCOMOTIVE LEADS TO POWER SAVINGS IN GENERAL OPERATIONS

Under many conditions, the battery in a combination locomotive of this type is not called upon for as much work as would be the case in the straight storage type, yet at the same time the locomotive does more work during the day's run.

There is one benefit to be derived from the use of the storage-battery locomotive in mine service to which sufficient attention has not been given, and that is its

relation to the power plant or purchased supply of energy. No matter whether the electric power used in a mine is purchased or generated, it is important to get the most out of the power company's contract conditions or to run the generating plant in the most efficient way. The latter entails so far as possible a full load while running and making the time of operation as short as can be arranged.

The storage-battery locomotive can be made to play an important part in this connection. When power is purchased it is necessary to pay for the maximum amount used, if only for a short time. If the maximum demand can be reduced and averaged up or the load factor can be improved during the entire 24-hour day, the power bill at the end of the month is going to be advantageously affected.

Every trolley locomotive in use during the day is drawing power from the source of supply, but every storage-battery machine in use during the day does not draw power while it is running but is using the power which was stored up at a time when the mine was not gathering or hauling coal. What is the result? Storage-battery locomotives relieve the power supply or generating plant of demand during the busy hours and create a load during the idle part of the 24-hour period, thereby reducing the maximum demand or size of generating plant required.

I have known of situations where advantage has been taken of this feature and where the use of additional storage-battery locomotives in place of trolley machines has prevented the necessity of installing more generating machinery and the purchase of more power besides improving the load factor. Here is a point well worth investigating. The new combination locomotive fits in here splendidly. Every straight trolley locomotive when starting a trip of cars throws a heavy demand on the power line, but with the combination type the pull on the power line is absolutely limited to the 80 amp. or whatever current the adjustment was made for, the balance coming from the battery. Any electrical engineer can figure out what this means.

Again, with this combination type of locomotive, a large proportion of the current used from the battery can be put back during the working hours. This will shorten the time required for charging after the mine closes, and enables the generating plant to be shut down and the attendants released that much earlier.

Of course, this feature has to be worked out differently according to whether the cutting is done during the day or at night, and whether the power is purchased or generated. The fact remains, however, that with the storage-battery locomotive a method and opportunity is available for arranging the load in the most efficient and economical manner.

There is one consideration which, although not directly connected with storage-battery locomotives has nevertheless an important bearing on their operation, and that is the use of anti-friction bearings on the mine cars.

Anything that will reduce the tractive effort or drawbar pull required to move a trip of cars tends to increase the amount of work that can be done by the storage-battery locomotive, not only as regards the number of cars per trip hauled but also the total number of cars moved per day.

In trolley locomotive haulage, while friction means a loss of power, it is not of such importance as with a

storage-battery machine where the total amount of power available is limited to the battery capacity. If double the amount of work can be done by the locomotive on the same battery capacity it means that the investment cost for a given operation can be approximately cut in half. Another way of looking at this matter is to consider that moving a trip equipped with plain bearings is equivalent to hauling a train of cars with the brakes partly set.

Now, a few words as to the cost of maintenance and upkeep of the storage-battery locomotive. The battery end of this problem is taken care of by the manufacturer's guarantees and renewal schedule, under which it is possible to determine what the maximum figure is likely to be. The actual cost will depend on whether by careful operation it will be possible to make the life of the battery exceed the guaranteed period.

Given a well designed and constructed storage-battery locomotive built along the proper lines of ruggedness, simplicity and easy accessibility to all wearing parts, the wear and tear is small and compares favorably with that upon other mining machinery such as coal cutters, pumps and hoists. In fact, a locomotive, if kept in proper adjustment instead of being allowed to



THIS LOCOMOTIVE IS BEING USED BY THE TROLL COAL MINING CO., FAIRPORT, OHIO

run without attention until something breaks, should be kept in first-class operating condition for less than 5 per cent. of its first cost per annum. This figure has been checked carefully by ascertaining the amount of material and spares purchased by a number of customers.

To summarize briefly on how to secure the best results from the use of storage-battery locomotives, I would submit the following suggestions:

1. Be sure that the conditions are suitable for the use of storage-battery locomotives.
2. Select a locomotive built to stand the service and one that will give reliable and continuous operation. Ruggedness, simplicity and easy access to parts are the three special features to be secured. These insure continuity of service, which is the prime necessity in a coal mine. The loss of part of a day's output is not all the loss incurred. The injurious effect and the slowing up of the entire organization counts for vastly more.
3. Be sure that the battery capacity is ample to afford a full day's work with a comfortable margin left. Expect and demand an equipment that may be relied upon for 300 working days in each year.
4. Having secured such a locomotive, give it reasonable care and inspection. If one-half the care and regular attention were given to storage-battery locomotives

that are given to mules, the results would be surprising. It should be remembered, also, that storage-battery locomotives do not have to be fed every day when they are not working.

5. The storage-battery locomotive is a willing servant, it will go on operating in spite of lack of attention without giving visible signs of distress until something breaks and has to be renewed. Feed it—that is, charge it regularly. Inspect and overhaul the various parts before lack of adjustment produces undue wear and it becomes a piece of machinery that can be depended upon absolutely.

I would gladly, if it were possible, have given some general information on costs of operation as compared with other methods of mine transportation, but each case must be considered on its own merits. It would be only misleading to estimate what could be done, without a careful investigation of conditions. I know of mines today that are considering the use of storage-battery locomotives for the sole reason that they feel that if they provide this modern equipment they will have less trouble in getting and keeping their men because of the better and more regular conditions of operation that will be thus created.

I have tried in the foregoing to present only real facts concerning the accumulator locomotive and its proper place in the coal-mining industry. I am personally interested in the development of this machine and in seeing it reach the place it should occupy in the mines, but at the same time I would urge primarily careful consideration of conditions in each case, to see that they are suited to such locomotives. Secondly, but of almost equal importance, is the proper selection of the machine.

The time has passed when it is either necessary or advisable to sit back and wait for the other fellow to try out this type of machine or for the perfect locomotive to be built. Perfection in anything is hardly if ever attained, but when a degree of perfection has been reached that makes apparatus a commercial, money-saving factor, its adoption becomes only a question of how much can I save. Investigate and see what is being done and take advantage of the modern methods that are now in daily operation in every section of the coal field.

The New Wellesley Colliery

BY M. MEREDITH
Liverpool, England

The Wellesley Colliery is one of seven collieries owned by the Wemyss Coal Company, Limited, Fifeshire, Scotland. After a large outlay of capital, the colliery is now capable of an extensive output, and the beds worked reach outward under the Firth of Forth. No. 1 pit was completed before the war, and No. 2 has been re-sunk recently to a depth of 1500 ft. Both shafts are situated not far above high-water mark on the shore of the Firth of Forth.

No. 1 shaft is 1632 ft. deep to the sump, and the Dysart main seam was cut at 1586 ft., but the landing for this bed is at 1550 ft. This shaft was dug upward for 900 ft., from five different levels driven off No. 2 shaft. No. 1 is elliptical, 14 ft. 10 in. across by 27 ft. 6 in. long, and is lined top to bottom with 18 in. of brickwork. It is fitted with steel rail guides fixed to steel girder buttons. The upper portion of No. 2 shaft will be stripped and enlarged to full size shortly.

Ten beds of coal and one of cannel are intersected by the shafts. Five are at present being opened out from No. 1 pit, which is fitted with double-deck cages holding eight cars, the capacity of each car being 1680 lb. of coal. Both the pit bottom and the pit head are arranged with two decks for simultaneous loading. The pit bottom is double-decked for 100 yd. on the west side and for 80 yd. on the east side. The feeders are so arranged that every main haulage road can deliver its coal to either the top or the bottom deck as required, while the empty cars running off at the east side of the shaft come together at a common level at the foot of two "tub creepers," which elevates them high enough to run by gravity to the hanging-on places for the different haulages.

A DOUBLE-DECKED BOTTOM

The dimensions of pit bottom are: 22 ft. wide by 18 ft. high from the floor of the bottom deck to the roof of the top deck. The side walls are of brick and cement, 5 to 6 ft. thick, and the roof is supported by steel girders surmounted with cement concrete. The top deck floor is of girders and concrete.

Two main pumping engines are employed, one at the Dysart main level and the other at the Coal More level (1345 ft. deep). Each has a capacity of 1000 gal. per minute at 40 r.p.m., and both deliver to the surface. The engines are compound condensing, with Corliss valves, and each has a heavy flywheel. The steam pressure is 150 lb., and seven of the eleven Lancashire boilers have super-heaters in the main uptakes giving 150 deg. Fahr. of superheat.

The steam pipes in the shaft are of lap-welded steel with welded-on flanges. They are covered with 2 in. of 85 per cent. magnesia sectional covering with steel galvanized sheets on top. The expansion is taken up at the surface by a double-armed spike and packing box. There is one water delivery column, 10 in. in diameter, from the lower to the upper pump, and 14 in. in diameter from there to the surface. The pipes are lap-welded with welded-on flanges and are in 18-ft. lengths. As a duplicate, two Sulzer pumps are placed at the Dysart main level, each of 500 gal. capacity per minute. These deliver to the Coal More lodgment; they are driven by direct-current motors with a voltage of 500. At the Coal More position two Sulzer pumps each capable of handling 1000 gal. per minute against 1350 ft. deliver to the surface. These are driven by squirrel-cage motors with a voltage of 6000.

A LARGE HOIST IS INSTALLED

The winding engine at No. 1 shaft consists of a pair of 38 x 78-in. cylinders, with a drum 20 ft. in diameter by 9 ft. 6 in. long. The drum is lagged with oak staves on top of ½-in. boiler plate. Steam brakes and reversing gear are fitted to this machine, while Landale's control gear for prevention of overwinding is connected to the engine. The steel-lattice pit-head frame is 100 ft. high to center of the pulleys, which are 18 ft. in diameter. These are built up in sections with flat arms and cast steel rims turned to take ropes 2½ in. in diameter. Ormerod's detaching hooks are employed.

The screening house is of steel construction with concrete flooring and corrugated sheeting on sides and roofs. There are nine shaking screens and picking bands. The plant has a capacity for screening 4000 tons in 8 hours, and is driven by direct-current motors throughout; each motor is duplicated. The boiler plant

consists of 11 Lancashire boilers, working to 150 lb. pressure. These are fed by Weir pumps through Green economizers.

In the electric power house are three Belliss & Morcon direct-connected engine-driven units of 220 kw. each. These operate at 500 volts direct-current. A mixed-pressure turbine plant of 1000 kw. capacity also operates at 6600 volts, as well as a high-pressure turbine set of 1200 kw. capacity. The mixed pressure set uses exhaust steam from the winding engine and the Belliss sets. The power house is ventilated with air drawn by a fan through an air filter of the water-spray type. The air is delivered at a water-gage pressure of about $\frac{1}{2}$ in. and finds its exit at the open window. No dust-laden air can enter by windows or doors. The condensing water from both turbines is cooled in two spray ponds.

A WADDLE FAN IS EMPLOYED

One Waddle fan 21 ft. in diameter over the blade is used for mine ventilation. This is designed for 200,000 cu.ft. of air at 4 in. water gage when running at 125 r.p.m. There is also a Sirocco fan 119 in. in diameter, capable of giving 400,000 cu.ft. at 8 in. water gage driven by a Belliss & Morcon engine direct-coupled. This fan can be used for either exhausting or forcing as required. The Baum washer plant consists of two units with a capacity of 100 and 120 tons per hour respectively. Both are run together when required. The slack coal through 2 $\frac{1}{2}$ -in. diameter holes is washed in one double washing box and sized into five different grades. Slack coal is brought to this washer from six other collieries of this company.

A bath- and a change-house is provided for the workmen. The bathroom is situated in the pit-head housing and its floor level is about 15 ft. below the level of the bottom deck of the pithead, and 30 ft. above ground level. One entrance is by a stairway from the banking level, about 40 ft. from the shaft, and the other entrance is from the outside of the pit-head housing. The floor and roof are of concrete, and the walls are brick and cement filled in between the stanchions supporting the pit head.

DETAILS OF THE BATH HOUSE

The lower half of the walls is built of white glazed bricks. The room is about 110 x 39 ft. and is from 10 to 14 ft. high. There are 84 bath cubicles, and in each is a hot water spray. These cubicles are made of galvanized cast-iron plates covered with white enamel paint. Clothes are hung on hooks drawn up to the ceiling along which are disposed a series of ventilation pipes with apertures for the ingress of air. These tubes are connected to an exhausting Sirocco fan. The air enters the building through a series of steam-heating coils fitted over apertures in the floor, and is thus warmed. It is drawn off by the fan.

There are 320 clothes hooks at present, but more can be fitted when required. The men enter the bathroom by the outside entrance in the morning. They change into their pit clothes and leave their clean ones hanging on the hooks. Each man has his own hook and padlock. From the bathroom the men go upstairs to the banking level. When coming off their shift they go directly downstairs to the bathroom so that there is little chance of catching cold. The baths are free, but the men provide their own soap and towel.

A New Arc-Welding Dynamotor

A new plastic-arc welding unit has been brought out by the Wilson Welder and Metals Co., 2 Rector St., New York City. This set is composed of a dynamotor and current-control panel. The generator is flat-compound wound and maintains the normal voltage of 35 on either no load or full load.

The control panel contains many new features. It has been designed to provide a constant-current controlling panel, small in size, of light weight, simple in operation and high in efficiency.

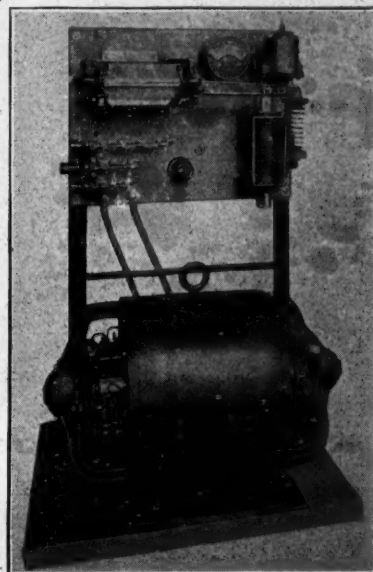
The panel is of slate 20 x 27 in., and on it are mounted, a small carbon pile, a compression spring and a solenoid working in opposition thereto. The solenoid is in series with the arc so that any variation in current will cause the solenoid to vary the pressure on the carbon pile, thereby keeping the current constant, at the value to which it is adjusted.

This is the well known principle of the Wilson control of constant heat in the weld. Practically any metal can be welded with this outfit, without preheating or annealing, which are decidedly troublesome.

Three switches on the panel provide an easy means of current adjustment, between 25 and 175 amp. The arrangement of the welding circuit is such that 25 amp. always flows through the solenoid when the main switch is closed, whether the welding current is at the minimum of 25 amp., or the maximum of 175 amp. The balance of the welding current is taken care of in by-pass resistances hunted around the solenoid.

This outfit can be furnished as a dynamotor unit, with standard motor characteristics as follows:

110-220 volts direct current, or 220-440 volts, 60 cycle, two or three phase alternating current; also as a gasoline-driven unit, or it can be furnished without a motor, to be belt-driven. The normal generator speed is 1800 r.p.m. The net weight of this new outfit in standard characteristics in 800 lb. with direct-current motor, 807 lbs with alternating current motor, 1200 lb. with gasoline engine and 550 lb. as a belted outfit without motor. These new dynamotor sets can be mounted on a truck for portability, if desired.



DYNAMOTOR WITH
CONTROL PANEL

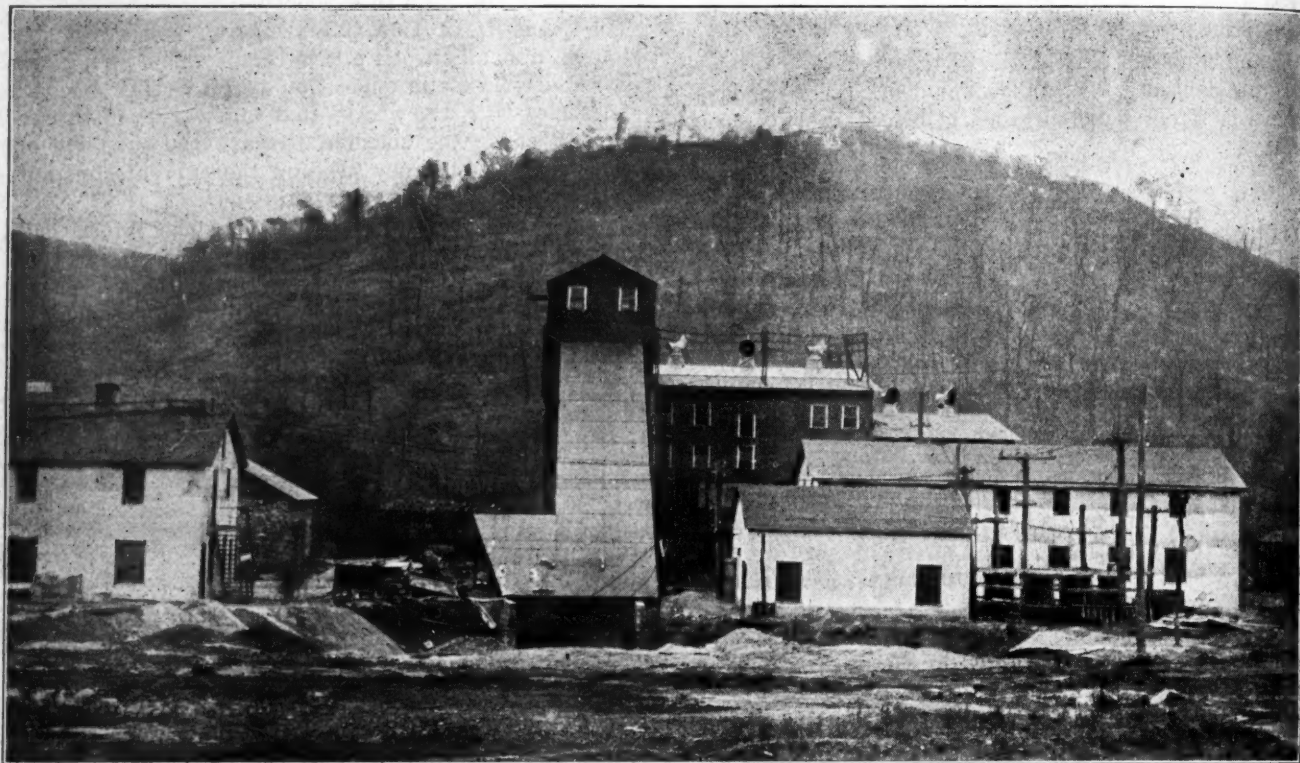
"Hog" fuel consists of sawmill refuse after it has been put through a machine which shreds and grinds it into a fairly homogeneous material. This fuel varies in consistency from fine sawdust to slivers or shreds several inches in length. The value of this material as fuel depends upon the class and kind of timber being cut in the sawmill.

Long Conveying Apparatus in a Pittsburgh Mine

One of the longest conveyors in western Pennsylvania may be found in the No. 3 Mine of the Valley Camp Coal Co., situated near Parnassus. The mine in question is in the Upper and Lower Freeport beds of coal.

A rather unusual geological formation is encountered at the No. 3 Mine. The two beds mentioned are nearly together, being separated by a scant 4 in. of binder. The two beds have a general working thickness of 7 ft. On top of the upper

This conveyor has a carrying width of 5 ft., and is electrically operated by a 250 hp. General Electric motor. At the bottom of the slope, the mine cars are dumped into a hopper from a horn type of dump, which feeds onto the conveyor, at the same time distributing the coal evenly over the surface. The coal is brought up the slope and into the tippie, whence it passes over shaker screens where four sizes are made. The slack enters a conveyor and passes underneath



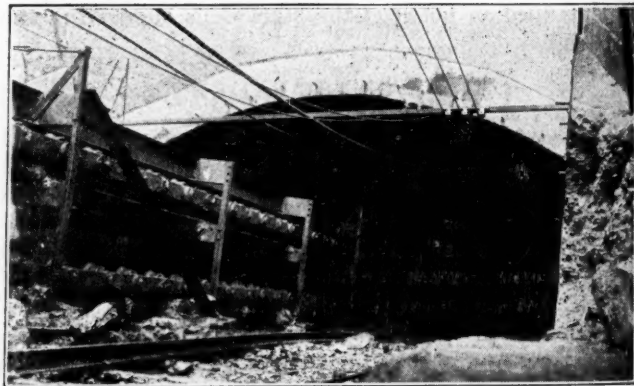
GENERAL VIEW OF THE TIPPLE AND SURFACE BUILDINGS OF THE VALLEY CAMP COAL COMPANY



VIEW SHOWING EXPOSED PORTION OF CONVEYOR

bed is found 18 in. of cannel coal, which to date has not been removed as it forms an excellent roof with a negligible tendency to weather.

The mine is entered by a slope on a pitch of nearly 60 deg., the distance to the bottom being about 500 ft. The conveyor is a typical piece of steel apparatus made by the Link Belt Co. It leads from the top of the tippie through a covered shed, and thence down the slope to a point several feet beyond its bottom. It is of the endless chain type, the total length being 800 ft. Of this only 400 ft. actually conveys coal, the rest forming the return underneath the loaded side.



CONVEYOR LEADING DOWN THE SLOPE

the lump conveyors. The other sizes are each loaded from a boom forming an extension of the picking tables. The entire apparatus on the tippie is under the control of one man, who also assists in the picking. Slate and refuse separated from the coal on the conveyors passes into a rock bin through steel chutes.

The No. 3 Mine has a daily output of 3,000 tons in 8 hr. This is a remarkable figure when it is considered that only 550 men are employed, 500 of them being underground. The operation is less than three years old. Fifteen Westinghouse, 13 and 10 ton, trolley type locomotives are used on the haul-

ageways, the heavier machines being utilized on the mains. Twenty Sullivan short-wall cutting machines are employed in the work at the face.

As can be noted in the illustrations, the slope has two compartments, one of which being occupied by the conveyor. The other side or compartment is utilized for the transportation of supplies, in which work motive power is furnished by an electric hoist engine. There are 15 General Electric motors of various sizes, used at the tipples for driving the Link Belt equipment. Power for the operation of the entire plant is purchased from the West Penn Power Co. One of the features in the construction of the plant buildings is that each has been given a stucco covering from a cement gun. Many of the miner's dwellings have likewise been given the stucco treatment.

World Production of Coal

The table below, prepared by C. E. Leshner, of the U. S. Geological Survey, attempts to assemble the available information on the world production of coal during the last six years. Owing to uncertainties caused by the war, especially in Central and Eastern Europe, the statistics must be regarded as tentative.

PRODUCTION OF COAL IN THE IMPORTANT COUNTRIES OF THE WORLD
(In Net Tons)

	1913	1914	1915	1916	1917	1918
United States	569,960,219	513,525,477	531,619,487	590,098,175	651,402,374	678,211,904
Great Britain	321,922,130	297,698,617	283,560,980	287,140,410	278,319,149	255,040,328
Germany	305,714,664	270,594,952	259,130,732	272,099,000	281,429,000†	273,930,000‡
Austria-Hungary	60,575,201	53,396,400*	52,670,712†	55,482,000†	50,000,000*	50,000,000*
France	45,108,544	32,765,156	21,946,000*	23,670,000*	31,847,000*	30,864,000*
Russia	35,500,674	36,414,560	31,158,400	28,962,724	30,047,000*	30,047,000*
Belgium	25,196,869	18,424,000	15,691,000	18,588,000	16,446,000	15,229,000
Japan	23,988,292	24,574,000	22,539,000	25,238,000	28,000,000*	30,600,000*
China	15,432,200	10,199,200*	19,800,000*	22,000,000*	.....	.....
India	18,163,856	18,439,975	18,673,984	18,389,372	19,405,550	.....
Canada	15,115,089	13,637,529	18,267,023	14,461,678	14,046,759	14,979,218
New South Wales	11,663,865	11,644,476	10,582,889	9,102,420	9,290,000	10,160,000
Spain	4,731,647	4,877,000	5,155,000	6,160,380	6,619,102	.....
Union of South Africa	9,857,361	9,461,674	9,275,083	11,208,402	11,628,870	11,937,682
New Zealand	2,115,834	2,548,664	2,473,659	2,527,991	2,316,629	.....
Holland	2,064,608	2,121,394	2,488,363	2,920,000	3,326,000	5,277,818
Chile	1,362,334	1,198,000	1,291,000	1,563,000	.....	.....
Queensland	1,162,497	1,180,825	1,147,186	1,016,654	1,174,290	1,101,176
Mexico	982,000*	.....	.....	.....	.....	.....
Turkey	909,000*	.....	.....	.....	.....	.....
Italy	772,802	859,516	1,045,256	1,439,538	2,090,000*	.....
Victoria	668,524	691,644	588,104	468,270	566,007	.....
Indo-China	617,912	608,660	708,800	856,000*	.....	.....
Dutch East Indies	453,136	626,351	485,158	539,816	910,000*	1,000,000*
Sweden	401,199	404,146	457,184	457,262	.....	.....
West Australia	351,687	357,526	321,065	337,709	.....	.....
Serbia	335,000*	.....	.....	.....	.....	.....
Bulgaria	324,000*	.....	.....	.....	.....	.....
Peru	301,970	317,923	323,680	351,703	395,802	.....
Roumania	267,000*	.....	.....	.....	.....	.....
Rhodesia	237,728	391,394	458,934	491,532	.....	.....
Tasmania	61,648	68,130	66,000	62,244	.....	.....
Other countries	2,550,000*	.....	.....	.....	.....	.....
Approximate total for the world	1,478,000,000	1,332,000,000	1,312,000,000	1,401,000,000	1,473,000,000	1,468,000,000
Per cent of world total produced by United States	38.5	38.5	40.5	42.1	44.2	46.2

*Estimate, subject to revision. †Hungarian production estimated at 10,000,000 tons. ‡German lignite production estimated at 97,000,000 tons.

NOTE—Because of the confusion introduced by the war into the official statistics of many countries, the above figures must be regarded as tentative and subject to revision.

Unless the most economical methods of coke manufacture prevail after the war, according to the *Iron Trade Review*, the world supremacy of the iron and steel industry of the United States may be seriously threatened in the coming days of competition when productive science promises to be more efficient than ever before.

Black smoke is the result of the decomposition of hydrocarbons driven from coal as volatile matter. The black part of smoke consists almost entirely of finely divided carbon. Analyses of the solid portion, or soot, show it to be nearly pure carbon, with a little tar and ash.—*Bureau of Mines Bulletin No. 135.*

In the last year before the war the world's total output of coal approached a billion and a half tons. The outbreak of hostilities caused a tremendous drop in production which had reached its lowest point in 1915. Thereafter, as the warring powers realized that the struggle was one of munitions quite as much as of men, the world's production was greatly increased. During the last two years of the war it reached a level approximating that of 1913.

All of the great coal fields of Europe lay within the belligerent countries, and in all of them production declined. Even those districts that were fortunate enough to escape devastation suffered from lack of man power and transport. Deprived of their normal imports from England and Germany, the neutrals and Italy endeavored to increase the output from their own scant resources. The stimulus to production supplied by the scarcity in Europe was felt even in Africa, the South Seas and the Orient.

Upon the United States, however, fell the chief burden of making up the deficit caused by the war. In 1913 the country was contributing 38.5 per cent. of the world supply. During the war its share increased at the rate of about 2 per cent. per year, until in 1918 approximately 46 per cent. of the world's output of coal came from the United States.

None but safety and approved portable electric lamps should be permitted in a mine during the rescue and recovery operations. Immediately after an explosion the store manager or supply clerk should arrange to obtain 100 safety and 100 electric miners' lamps. If such lamps are not already on hand, requests should be made to near-by mines, and the agents of the lamp firms should be immediately reached by telegraph or telephone. Most lamp agencies keep large quantities of safety and electric lamps ready for immediate shipment.—*Rescue and Recovery Operations in Mines.*

It is reported that electrical and compressed air coal-cutting machines will be introduced shortly into coal mines in the Manchester, Bolton and Leigh (England) areas.

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A Country of Privilege

Gradually our nation has drifted from a country of equal opportunity into a country of privilege—a land where certain acts are permitted to some and not to others. Many there are who favor the idea that the race of life be run by each individual on his own merits. Others seek to have handicaps placed on the speedy, claiming that the best race is that where the fast and the slow by an equal exercise of endeavor have an equal chance of attaining a place at the goal.

This latter condition, in which favors are shown to those who appear to need favors and withheld from those who appear not to need them, is a wide deviation from the program as laid down by our fathers. They believed firmly in the doctrine of "leaving be" (*laissez faire*), advocating that there should be no handicaps whatever for all restrictions imposed on the fleetier only give the laggard an unfair advantage.

In consequence of this handicap view of the race of life, we have accepted in our political world the practice of representation without taxation. There has been more than a suggestion that the same principle be put into industry; in fact industrial democracy is nothing more nor less than an extension of that principle.

Again labor has for generations been privileged to profiteer. A man receiving \$1000 a year, if he has the talent or merely the opportunity, may leave his job and enter another paying several thousands of dollars per annum. No one blames the workingman when without combination he obtains a large remuneration either with his own company or by a shift to another. He may double, treble or quadruple his pay, without doing any more work, and everyone is ready to congratulate him as a genius and a "lucky dog." One of the rights of labor and one generally conceded is that the working man shall be allowed to sell his labor in the highest market.

To continue along the same line, it may be added that for the most part labor is no longer subject to the injunction; and the right to combine in restraint of trade is now no longer denied to the workingman. In fact the Government has been actively friendly to such combinations. The organizations of working men are not required by law to keep contracts, no matter how solemnly and recently made. Furthermore, laws against boycotting have been repeatedly violated, and perhaps only in one case, has recovery been sought and obtained. Misrepresentations amounting to slander by labor unions are never made matters of criminal prosecution. Though labor union organizations have again and again aided and abetted violence, they have been allowed to escape scot free. In this way the practice of permitting privileges to grow up between certain types of citizens and others has grown rapidly until we have a country of privilege.

We are repeatedly told that the public is against privilege as a thing abhorrent. Doubtless it is, but the sentiment is not so strong as is the apprehension and conviction that if labor is given powers which are refused to capital, labor will do just what capital intended to do when it was not restrained. We are learning that if we

leave labor uncontrolled we shall be sure to find that the laboring men are not of such moral and intellectual fiber that they will abstain any more than the capitalist from taking undue advantage of that fact. The present coal strike is evidence that the public fear is well justified.

The public's opposition to private law is not so much that it violates the equality between man and man, as that the persons having a private law which gives them exemption are given a dangerous power to put an undue burden on the public. Producers' trusts, which extort more from the public than the costs of production justify, are restrained by law because high prices distress the public. Just in like manner, labor trusts must be suppressed, at least restrained, not because the laboring men are unfair to their employers but because by their ill-advised action they injure the public, and this public is predominantly made up of wage earners. The objection to the exclusion of labor from control is not so much to the privilege thus granted as to the fact that the lack of control of labor ends in the exploitation of one laboring man by another.

America has just gone through one of the greatest wars in all history and has emerged triumphant. Can it now escape paying the price? The burden will fall upon each individual whether he wishes it or not. The labor profiteers appear to be attempting vainly to shift the load to the shoulders of somebody—anybody-else so long as they themselves can escape.

Seasonal Industries Are Many

One of the great sorrows of coal mining is statistics. For instance, the United States Bureau of Mines keeps detailed and careful track of the fatalities and accidents of the industry. For a while the Bureau planned to take cognizance of the mortalities and sicknesses from tuberculosis among coal miners, but it lost interest when it found that the mortality rate was low and sickness less than what is usual in other industries.

Again the United States Geological Survey is diligently recording the regularity with which the mines work. Perhaps no other industry has a service of this kind rendered it by a department of the Government. No one suggests that these inquiries shall be done away with. They are certainly not without their value, but it is necessary that the public should be careful not to assume that the industries that are so meticulously watched and censoriously scolded are necessarily as bad as, or worse than, those which are not subject to so much scrutiny.

There are a number of seasonal employments—bricklaying, brickmaking, stonemasonry, carpentering, draying, moving, decorating, papering, icemaking, ice gathering, lumbering, railroading, to mention only a few. Nothing has been said about farming or merchandizing though they also are quite irregular in their activity. Some are so seasonal that there is no attempt made by the employees to enter the industry permanently, and no effort on the part of the employer to keep a permanent force. Apparently the less an industry does to guarantee steadiness of employment the less it is held responsible for that irregularity.

It is quite generally the custom for the employee in an irregularly operated industry to weather the idle time either by adequate savings or a good reputation on which credit can be built. The mine worker, however, has little credit because the industry has always had company stores and this has attracted men to the industry who had no credit and who entered the mines because after

a day's work they could draw sustenance and clothing from the store. The existence of such credit has tended to bring improvident men into the industry, to hold them there and to keep them improvident.

Any industry where collections are slow and uncertain and where credit cannot be obtained attracts men who are able to wait for their pay and who "salt down" their earnings against an evil day. Where such provident men labor, no statistics register their misfortunes and no one sympathizes with their difficulties. Often by reason of their frugality they ask neither statistics nor sympathy, for they, despite all their adversity and irregularity of employment, build up a fair deposit at the bank and buy a home.

It is far from fair to say that all mine workers are of an improvident type. Their happy homes and the social standing of their children are a tribute to their frugality and to the unremitting toil that they have exhibited whenever occasion offered. They meet the summer slackness by an economy as careful as that exhibited in other seasonal industries. But there are many who are extremely ill equipped to meet a period of irregular operation. The worker in many a seasonal occupation would esteem himself fortunate if he could get 50 per cent. full time in the slack seasons.

At Last Our Strike Is Ended

(Written as of Nov. 25, 1919)

The long, long trail has been traveled. We are through with the pressmen's strike and the compositors are returning, and in this fact, not only ourselves, but our striking employees are greatly to be congratulated, for if they had won that for which they contended, and a few more strikers like them had also carried the day, there would have been an orgy of strikes, and life in this America of ours would not have been worth living.

They have helped the steel workers, and the mine workers also, to prove that striking does not pay, that, in general, justice can be secured without it. They have exhibited the fact that the public is against attempts to raise wages in larger proportion than the cost of living. That being so, we congratulate them. The public is gainer, they are gainers, so are we.

The public, pushed along unceremoniously, has at last backed its foot against a rock—the firm foundation that wages must be based on cost of living and not on the desires of any group of workers. Others may advance till they reach that rock, but hereafter they may go no further. There is a bigger union than the American Federation of Labor, than any international union, than any seceding local, and that is the Union of the United States of America.

The whole public has sanely determined that while injustices must be removed, no unjust increases must be obtained at the expense of the public. Uncle Sam is well armed. He has thrown his redoubtability against trusts of capitalists; it was but his good nature that made him tolerant of the labor trusts regarding the real character of which he, for a long time, gave not even a thought.

We rejoice, not only in our triumph, not only in the fortunate outcome for the public, not only that our employees are happily back at work and again making those earnings on which their families depend, but in the fact that the strike increased and rendered infinitely stronger than anything else could have done, the goodwill between ourselves and our readers. We did not expect so many words of sympathy and appreciation. The flood of kindly letters we received gave us a fuller sense

of our opportunities, a deep regret that for a while we could not meet them and a sense of the big heart of the coal industry which will give wings to our words whenever a chance to present such words is afforded.

Unfortunately we are behind with our issues and something must be done to bring them up to date despite the congestion of the presses here and in other towns. It may be necessary to take steps to combine issues and thus accelerate matters, thereby getting back to our former schedule.

Trade is Still Barter

Coin, notes, checks, and drafts do but mysteriously disguise the fact that trade is merely barter just as it was in barbarian days. When a commercial transaction takes place both parties are sellers; both also are buyers. We must take as much as we give; we must give as much as we take, or it is not trade.

Gradually we are learning that we must be ready to receive from Europe or we cannot go on selling. For copper or for coal or for whatever we send shipladen to Europe we must take in like measure from Europe. What it shall be, we do not know, but that it must be, that we do know. At present, we are casting around for the name of the booty that must cross from the western bounds of Europe to our eastern shores. But the search eludes us. There is little that we are willing to take and almost nothing that we need.

Soon, seeing that we cannot sell because we see nothing that we want to buy, we may give up all attempt to trade. But we are not likely to give up trying to sell, so perhaps we shall rejoice rather than mourn when we find something that John Bull or Jean Crapaud has that Uncle Sam requires. Mayhap we shall look around just as cheerfully for something we would like to buy as we look around today for places in which to dispose of our product.

Great Britain was a creditor nation more willing to buy than we and less anxious to sell to those who already had a large account with her. Great Britain was, therefore, an advocate of free trade during those years.

We have changed roles with Great Britain and perhaps we shall change policies also. A banker remarked in confidence the other day that *we* of all others may yet be the great free-trade people, the followers of the doctrines of Bright and Cobden. New conditions result in new manners. The Britisher as often went abroad to buy as we send men abroad to sell and we may find a change in our national psychology.

Undoubtedly exchange involves inferiority of some kind on the part of the exchangers. He who gives salt for cowries must have more salt than his fellow trader and less cowries than he, or he would not make the exchange. If we would, as a nation, be self-sufficient we cannot trade with other peoples. When once we "have it all" we are like him "who knows it all", we can receive nothing.

In the war we lamented that Great Britain had nearly all the rubber of the world and a large part of the tin, that Germany had potash and Russia platinum and it was fortunate that we were not in time of war able to supply ourselves without outside assistance. We propose now to be as nearly independent as possible. It will serve us well in war, perhaps also in peace, but if we are inferior to none, in every blessing of earth what foreign goods shall we be willing to receive and therefore what can we send away in barter?



DISCUSSION *by* READERS

EDITED BY JAMES T. BEARD

Ballasting Mine Tracks

Letter No. 1—I was much interested in reading the editorial entitled, "Proper Ballasting of Mine Tracks," which appeared in COAL AGE, Sept. 25, p. 536. In the same connection, kindly permit me to submit the following notes from my own experience in ballasting track on haulage roads, in sections of mines that required constant attention to keep the roads in passable condition.

In one instance, we had a particularly troublesome piece of track, which it seemed almost impossible to drain properly. Such was the nature of the bottom or floor of the seam that the tendency was for the roadbed to constantly sink below the level of the ditches. It so happened that, in that particular section of the mine, sandrock was very plentiful. This rock was broken to suitable size and used as ballast under the track and for filling local dips. The result was the formation of a very substantial dry roadbed, which greatly improved the hauling, at points on the road where the soft fireclay bottom had previously given much trouble.

In another instance, much trouble was experienced when a road was opened up through some old workings where the bottom was soft. The drawslate being plentiful in that section, it was first broken to size and used as ballast; but this material proved too soft for the purpose and the attempt to improve the road by that means was unsuccessful.

Stone taken from the field was then broken on the surface and sent into the mine. The result was a good roadbed that gave no further trouble. We found that it was more convenient to break the field stone and haul it into the mine than it was to crush the sandstone mentioned in the first instance.

Let me add, as the outcome of these experiences, it is my belief that where proper care is taken in selecting and breaking the stone this form of ballast is superior to lagging or corduroy for the making of a good roadbed, where mine haulage roads must pass over a soft bottom. The stone ballast affords excellent drainage and the road is kept dry.

Portage, Penn.

JEROME C. WHITE.

Perpetuating the Thrift Habit

Letter No. 3—I was much interested in the letter of John Rose, COAL AGE, Sept. 18, p. 501, and in the previous letter of W. H. Noone, to which Mr. Rose has referred. With the writers of these letters, I feel that if the coal companies throughout the country would take more interest in matters that relate to the present comfort and future welfare of their miners there would be far less labor trouble.

In support of this conclusion, allow me to cite one instance that I believe would greatly assist in establishing better relations between employers and their men. The thought that I have in mind is not new but is greatly emphasized by the result of the efforts of many large coal operators to have their men invest in Liberty Bonds and Thrift Stamps at the beginning of the war.

Before the war, the miners were making as good money as now, considering the purchasing value of the dollar, and yet they did not as a rule save a cent of their earnings. As a result, few miners had anything laid by to enable them to

invest in Liberty Bonds and stamps on the terms offered by the Government. Few indeed among these men could have bought a hundred dollar bond and paid for it as required.

In order to assist the Government and at the same time to impress on their men the principle of thrift, many of the larger coal companies came to the rescue and purchased bonds in any amount desired by their men, giving them from ten months to a year to pay for the same. This act of the companies resulted not only in a large percentage of miners and laborers investing a portion of their earnings in government bonds and stamps, but incidentally the habit of saving was strongly impressed on the men.

In this connection, it has occurred to me that great good can be accomplished along similar lines if coal companies would start a movement that would encourage their men to allow the company to deduct a certain amount from their pay, the same to be deposited in a savings bank to the credit of the individual from whose pay it was taken.

As has already been stated, the average miner who has once started to save and has accumulated a snug nest egg will not be inclined to favor unjust demands on the company to the same extent as one whose habit is to spend as he goes. It is my experience that the man who saves a portion of his earnings takes more interest in his family and has a pride in the education of his children.

Not long since, I overheard a well-meaning man say, "I wish I had the money to send my boy and girl to college and give them the education that would fit them for higher work in life." The result of this man's having failed to save a portion of what he had earned is that his children must be satisfied with a common school education and, in the majority of such cases, the children must start to work and assist in the support of the family as soon as they reach the age limit.

My thought is that more co-operation between corporations and their men along the lines suggested will establish a better feeling between employer and employed, and make better citizens and more efficient workers. I feel that a goodly portion of the better class of miners would take advantage of such an opportunity if offered by their company and be thankful for the privilege. On the part of the company, it would require no greater effort than what they put forth in the matter of securing subscriptions for Liberty Bonds and Thrift Stamps to aid the Government in the prosecution of the war.

INTERESTED.

Johnstown, Penn.

Letter No. 4—Speaking of the thrift habit among miners, one is reluctantly compelled to admit that too many of this class of workers spend all they make. While the number may be smaller in some localities than in others, it would be difficult to find a mining community that did not furnish many examples of this thriftless class.

It has been said that "poverty and drink go hand in hand." Certain it is that the man who spends his money for drink has seldom enough left to buy the common necessities of life for his family. But, when a man begins to save and lays by his earnings to make a home, he finds that there are plenty of places for the money to go without spending it at the saloons.

The most casual observer cannot fail to find in every mining camp a shiftless class of men who never save money—they do not try, claiming that their pay is too small and the cost of living necessities too high to make it possible to lay any money by under these conditions. It is this class of men who are always found casting their vote in favor of a strike. It goes without saying that it takes but a few of this class to mar the prospects of a whole community of men.

Again, there is another class of pleasure-loving men who are all too ready to invest their hard earned money in luxuries that they cannot afford. Many miners are buying autos that they do not need except as a pastime. Buying a car is all right for a man who can afford it; but many fail to realize that it takes more money to run a car than the actual cost of the machine. A man who has a large family to support would do far better to invest his money in buying a house and thereby avoid the necessity of paying rent.

It is my belief that, once a man begins a bank account, he will keep at it if given a little encouragement. To this end, a good plan would be to distribute circulars explaining how money may be saved and safely invested and giving warning against exchanging Liberty Bonds for the many fake stocks that are being offered so widely at the present time.

Let me urge, in closing, that every father of a family should make it a point to school his children and give them the training that is needed today more than ever. Let us remember that the lack of education is the cause of much trouble every way, both in the work in the mine and in our social life. Rawdon, Quebec, Canada.

C. McMANIMAN.

Letter No. 5—I quite agree with the suggestions made by others in regard to encouraging the thrift habit among miners. It is well worth while to give a little of our time to the study of such a worthy cause. I believe that coal companies would derive much benefit that would reward them for the efforts put forth. All that is needed is to devise some practical means that will be effectual in promoting thrift among mine workers.

When one considers the results that may naturally be expected to come from an organized effort to encourage thrift among employees in every industry, the plea that coal companies are "too busy" to take upon themselves further burdens falls into insignificance. Some feasible plan needs but to be started and, if started aright, it will gain momentum and need little to keep it going.

Someone may ask, what have I to suggest as a beginning? The question must be studied from the operator's standpoint and we must realize that there are two general classes of mine workers: Those who live in the town or mining camp and form a community among themselves; and those who live further out in the country and enjoy the freedom of the country life. It is the first of these two classes that requires the most attention to interest the men and enlist their co-operation and help in sustaining a community life and spirit that will prove a benefit to all.

The social quality is inherent in all human beings and miners are no exception to the rule. Unless special efforts are made to counteract evil tendencies in any community, there will always develop what is undesirable, owing to the work of some few who become the active element in society and the majority are unwittingly led into their ways of thinking and acting, which are too often wrong and lead to inefficiency and loss to all concerned. The tendency is thus in the opposite direction to that of thrift.

The work of coal companies and employers of labor in other large industries is obviously to devise some means of satisfying the inherent social quality that I have mentioned and develop among their employees a social intercourse that will be helpful and right. As has been often urged in *COAL AGE*, social clubs should be formed, libraries and reading rooms started, gymnasiums built and other means of recreation and enjoyment encouraged. Lectures and evening classes

in the study of English and the simple sciences relating to mining, short courses in gardening, small fruit growing and sanitation should be introduced. All of these will be found most effectual in the accomplishment of their object, which is the building up of a strong, thrifty community life and making good workers and good citizens.

In making these suggestions, it is not my idea that the financial burdens should rest entirely on the companies who start and encourage the work. The project should be shown to be worthy of support by the state, from an economic point of view. When properly managed, many of these efforts will prove self-supporting. On its part, the state can well afford to supply good lecturers and competent teachers, while coal companies will generally be more than willing to build suitable places for assembling and give what is necessary to make the plan successful. In many instances, these several efforts can be so organized as to reimburse, by monthly payments, the company who furnished the means, and this would have a tendency to increase the pride and enthusiasm of the workers in carrying on the scheme.

At the present time, I feel somewhat as though neither employers nor their employees have the necessary confidence in each other to produce the highest efficiency and progress in the coal industry. Let me say that to the extent that we are short of the necessary efficiency, to the same extent will we be short of the desired amount of thrift.

Linton, Ind.

W. H. LUXTON.

Finding a Mine Door Set Open

Letter No. 7—Much credit is due Richard Bowen for having presented what it cannot be denied is a most important question and one which should be widely discussed by mine examiners and firebosses who have had long experience in the work. As stated by the editor, in his reply to Mr. Bowen's inquiry, *COAL AGE*, Sept. 11, p. 462, there are arguments on both sides of this question that are worthy of consideration.

The question is: How should a fireboss proceed when, on commencing his examination of a mine, he finds a door accidentally left open, which has destroyed the ventilation in the section of the mine he is about to examine? Mr. Bowen takes exception, seemingly, to the answer he quotes as given in a certain textbook, where it is stated that "the fireboss should close the door and wait a proper time for the circulation to be restored before continuing his examination of that section." To my mind, this is a proper answer.

Right here, let me say that a careful and competent fireboss would acquaint himself with what the fan was doing by observing both its speed and the water gage produced. A low water gage and a somewhat increased speed of the fan would at once tell him that the circulation in the mine was short-circuited. On entering the mine, his first step would be to ascertain the cause. We all know that, in such a case, he would enter the mine on the intake air and follow the current until he found the door that was not set open.

It should be remembered that mines are opened in different ways, by shafts, slopes and drifts, and, while some shaft mines are shallow, others are very deep. Now, it is my belief that the suggestion of closing the door and waiting for the circulation to be restored in the mine had reference particularly to the custom in vogue in deep shafts, in the old country, at a time when the entire mine was ventilated by a single continuous current, requiring many doors. It was then the custom for a fireman who found a door open at or near the foot of the shaft to close the door and return at once to the surface and notify the night engineer, who would take steps immediately to increase the circulation of air in the mine.

Assuming these conditions, it cannot be denied that it would be safe practice to close the door and return to the surface to wait for the circulation to be restored. It is true

that if a feeder was burning, at a point beyond where gas had accumulated, the restoring of the circulation might result in the gas being ignited and causing an explosion; but the fireboss, in that event, would be safe on the surface. It is possible to find recorded in old accident reports occurrences such as these.

The question presented by Mr. Bowen, however, requires us to consider present methods of ventilating coal mines on the split system; and we observe his illustration represents but a section of the mine, to be examined. This situation views the question from another angle and one cannot say but that it would be safer, as he suggests, to investigate further and ascertain the condition of the working places in the section, before closing the door.

Before deciding this point, however, it is important to consider if it is practicable and safe for the fireboss to incur the risk of entering unventilated places, which would require good judgment and the utmost precaution on his part when so doing. As a fireboss for a number of years, it is my belief that it is not practical to enter a section of a mine and proceed to make an extended examination where the circulation has been destroyed for any length of time.

Regarding the question raised by Mr. Bowen in reference to starting the examination of a section on the return end, let me say that my practice has always been to follow the air current, beginning at the intake end and examining each place in order. It is my habit to build the regulator at the head end or where the air enters a section.

However, it cannot be denied that to close the door shown standing open, in Mr. Bowen's sketch, would be dangerous owing to the gas accumulation in the first chambers of that section and the feeder burning at the face of a room further on. In the case presented, his point is well taken when he advises making a brief inspection of the places and extinguishing the feeder before closing the door. If shotfirers are employed in this mine, it is their plain duty to see that no such feeder is left burning after all shots have been fired.

Let me emphasize the fact, however, that it is always dangerous to start to examine a section of a mine at its return end, particularly if the air current is highly charged with firedamp. It occurs to me that, in the split system of ventilation, no door should be required on the entry where the rooms are driven to the rise, as the tendency of the air is to rise to the face of those rooms. Modern mine ventilation must be conducted in accordance with the mining laws of the state and due regard must be had for the splitting of the air, the use of double door, emergency doors, overcasts, regulators, air-tight stoppings and brattices.

Farr, Colo.

ROBERT A. MARSHALL.

Markers on Mine Trips

Letter No. 3—The subject of a safe haulage system in mines is one worthy of thorough discussion. Almost every day some accident or narrow escape from injury on the haulage road reminds us of the need of better and safer means afforded miners in going to and from their work.

Some mines provide a separate manway and have a fixed rule that no one is permitted to travel the haulage road. Such a condition closely approximates the ideal and, in mines where actual conditions favor providing a separate traveling-way, no time should be lost in establishing a rule that will keep men off the main haulage road.

There are many mines, however, where it is necessary for men to travel the haulage road; and, in all such cases, every precaution must be taken to avoid accidents. In the development of a mine, the entries should be driven on sights so as to provide a straight road. A winding road affords little opportunity to maintain a good clearance at the side of the track.

Wherever men must travel a haulage road, safety demands

that ample clearance shall be provided on the side of the track opposite to that on which the wires are strung. Refuge holes must also be cut in the ribs, whitewashed and kept free from all obstructions. The refuge holes should not be more than 60 ft. apart on a straight road and 30 ft. apart where the road curves or wings so as to prevent a clear sight ahead. These safeguards are provided in most Kentucky mines.

There are mines where the conditions are such as to make it necessary to adopt other means that will insure the safety of men who are compelled to travel the haulage road. In a mine equipped with electricity, lights should be installed every 200 ft. on all haulage roads and, particularly, at switch points and trapdoors where the chances of accident are greatly increased.

Speaking of signal lights and gongs to give warning of the approach of a trip, many such devices are in use. Where a trip is pushed by the motor, a good light or gong should be provided at the head end of the trip. The last car of a trip should also carry a good light. For this purpose, carbide lamps and safety lamps with red globes have been used. A piece of sheet iron painted white is sometimes hung on the rear end of the trip, being supported by a pin stuck down in the coal.

I have seen a very substantial trip light made of an iron torch such as is used by oil well drillers, a hook being attached to the torch to enable it to be hung on the car. A cowbell makes a good signal, but this must be hung free from the side of the car. Sirens and Ford horns make good signals, for use on motors, when they are kept in good condition. I think, however, these are no improvement on the simple bell or gong.

G. E. DOUGHERTY.

Pikeville, Ky.

Letter No. 4—Referring to the question of securing greater safety in mine haulage by the use of suitable markers on mine trips that will give due warning of their approach, as brought out in the inquiry of J. J. S., *COAL AGE*, Aug. 28, p. 379, I cannot resist the opportunity offered here to condemn the conditions he has described relating to the use of a steam locomotive on a main haulage road where the smoke of the engine so fills the entry that one can scarcely see the rails when walking along the roads.

On reading of such conditions existing in any mine, one is forced to the conclusion that the state mining laws that permit them are much below the standard required in safe mining. Similar conditions would not be tolerated in Alberta or the other provinces, in Canada, where we can boast of ideal laws governing the operation of mines, although I do not pretend to say but that these laws are often violated. The use of an internal combustion engine underground is strictly prohibited in our mines, as is also the use of electricity wherever conditions are such as to incur the risk of an explosion of gas or dust. The Coal Mines Regulation Act cites many restrictions regarding the use of electric or storage-battery locomotives and requires numerous safeguards and precautions relating to manholes on haulage roads and the providing of separate travelingways to avoid accidents.

Bells and gongs are good by way of warning men of an approaching trip; but, in the interest of safety, too much reliance should not be placed on these devices, which should be regarded merely as an extra precaution to be taken under dangerous conditions. It is more important, however, to eliminate as far as practicable such conditions and practices as make the work underground dangerous. J. J. S. speaks of the cars in his mine making "more noise than a dozen bells and gongs." Let me suggest that a safety-first inspector in that mine would make noise enough that he would be heard above the rumble of the cars.

To my mind, bells and gongs on haulage trips may be likened to the taking of pills and powders to combat disease

caused by living under unsanitary conditions. The fundamental principle of hygiene is the elimination of the causes that undermine health and produce disease. Remove the cause and avoid disease is my motto. Likewise, in mining, eliminate the cause of danger and accidents are largely avoided.

Chief among the factors that contribute to the safety and welfare of mine workers I would mention the following.

1. Adopting the most improved methods of modern mining practice. 2. Making and enforcing strictly safe rules and regulations in the operation of a mine. 3. Maintaining strict discipline at all times.

Modern mining practice, in respect to underground haulage, requires separate travelingways and forbids other than those whose duties call them there to go on the haulage road for any purpose whatsoever. When this is impracticable in any mine, refuge holes and other precautions must be adopted to avoid accidents. Either the workmen should be hauled to and from their places in special trips, or the work of hauling coal should not be commenced until all the men are in their places, and cease before the time for the men to start home at the end of the shift.

The power of discipline loses its force when a selfish foreman or boss, desirous of making a record for himself, orders a motorman or triprider to rush out another trip, which he knows cannot reach the bottom or mine entrance before the men will be coming out of their places. When this is done at the last minute there is much confusion and every possibility that a serious accident will result.

HOW ONE ACCIDENT OCCURRED

In closing, let me cite an incident that I recall and which occurred when I was a boy. It was on a Saturday and everybody was anxious to get out early to see the football match. About a mile of the haulage road, in that mine, was an incline rising on a heavy grade to the shaft bottom. The last trip out had started from the inby parting where the fireboss was struggling to keep back the men until the trip had reached the top of the incline. In spite of his efforts, a few of the more reckless of the men managed to slip by and started on their way out.

Before the trip reached the top of the incline, however, a coupling broke and 22 cars loaded with coal started on a wild run down the slope. The sad result was that five mangled and lifeless bodies were carried out of the mine that day. This incident and others of a similar nature have impressed on my mind the truth of the old adage, "Fools will run where angels dare not tread."

True mine discipline depends largely on good mine management and the bosses living up to the rules and regulations they impose on the men. The best results were obtained in a mine where I was employed and strict discipline prevailed. The slogan was "Safety First," and anyone guilty of violating the laws and rules was called to the office and lectured in a manner to convince him that he was wrong, after which he was laid off a number of days or weeks, depending on the offense.

STEPHEN DAVIES,

Pocahontas, Alberta, Canada. Jasper Park Collieries, Ltd.

Coupling Hooks in Rope Haulage

Letter No. 1—Referring to the suggestions on coupling devices, for use in hoisting and haulage on slopes and planes, appearing in COAL AGE, Sept. 26, p. 520, it occurs to me that the device shown in Fig. 3 on that page would be improved by the addition of a swivel, instead of the link connection shown. A swivel would permit the rope to untwist itself without turning the clevis over, allowing the pin to drop out.

In the case of long hauls, say 2,500 ft. or more in length, especially if there are curves in the road, the twist in the haulage rope becomes an element of danger. The use of a

swivel would prevent the rope from accumulating any considerable twist, which might result in serious injury to the triprider when he uncouples the rope.

Portage, Penn.

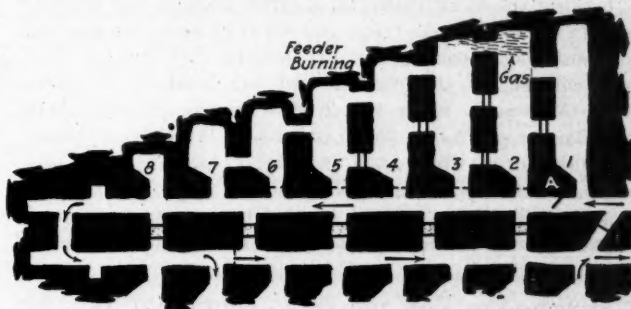
JEROME C. WHITE.

Finding A Mine Door Set Open

Letter No. 8—A study of the interesting question asked by Richard Bowen, "Coal Age", Sept. 11, p. 462, regarding the proper method of procedure of a fireboss on finding a mine door set open when starting his examination of the mine, shows that no hard-and-fast rule can be applied to suit every case. Practically all that can be said is, that the general rule requiring the fireboss to follow the intake current, in the examination of a mine, has many advantages; and, in the absence of any exact knowledge of extraordinary conditions prevailing in the mine, this is a safe rule to follow.

Assuming the conditions described by Mr. Bowen, as illustrated in the accompanying figure, if a fireboss traveling with the current found the door standing open at A, just inby of the mouth of the first room, he would naturally not waste any time attempting to find out who left the door open; but, from his knowledge and experience of this gassy section, he would immediately set himself to ascertaining the condition of the working places.

Proceeding up Room 1 and passing through the breakthrough at the face, he discovers gas at the head of Room 2. Without disturbing the gas, he passes on through Rooms 3 and



4 and finds the feeder burning in the face of the coal in Room 5. It is plainly his duty to attempt to extinguish the fire and if this is impossible, summon help. He knows the danger of disturbing the gas in Room 2 before extinguishing the fire in Room 5, and if he is a careful man he will at once close the breakthrough between Rooms 4 and 5 with a canvas, taking this from the mouth of Room 3 or 4, which will lessen the danger of the gas reaching the fire if accidentally disturbed by a fall of roof.

On the other hand, for the sake of argument and assuming the same conditions, let us suppose that the fireboss, having started his examination at the return end of this section, has proceeded as far as the head of the entries and while examining Rooms 8 and 7, a fall of roof occurs in room 1, which forces the gas through the breakthrough in the several rooms until it reaches the burning feeder and is ignited, causing an explosion.

The difference between this situation and that of an explosion occurring when the fireboss is at the intake and concerns only the position of the fireboss at the moment. If he is on the return side of the explosion he is sure to be overcome with the afterdamp produced and will have little chance for escape to fresh air. If he is on the intake side and the violence of the explosion is not sufficient to do him harm he has ready access to fresh air and his escape is assured.

I regret to say that, in several sections of the country, firebosses following instructions from their higher officials are starting the daily examination of the mine at the return end of the section to be examined, traveling against the air

current. The reason given for this practice appears to be that, if a dangerous percentage of gas is found in the main return airway, the source of its generation is quickly ascertained when the fireboss reaches the junction of the air split with the main return.

This argument, however, applies equally well whichever way the fireboss is traveling. It is only a question of which direction will bring him sooner to the split generating the gas. On the other hand, it must be admitted by all that it is a very dangerous practice to travel with a flame safety lamp against an air current charged with a dangerous percentage of gas.

DOORS ARE OFTEN LEFT OPEN OR BUT PARTIALLY CLOSED

In my personal experience both as fireboss and as mine foreman, I have frequently found doors propped open or only partially closed, because a driver or motorman, expecting to return shortly has set the door open for his own convenience; or because a triprider has allowed the door to drag along the trip, expecting it to close itself after the last car has passed, but this was prevented by a chunk of coal that fell from the car. In such cases, as fireboss, I would leave the door as I found it and continue the examination until I had ascertained the condition of every place in that split, after which I would return and close the door if it was safe to do so.

My conviction is that it is safer to follow the air current when making the examination of a mine, because the fireboss is then always working in fresh air, but if he advances against the current he is continually exposed to the foul air and gases generated in the section and his work is far less efficient. Moreover, when traveling with the current there is little danger of the flame of the safety lamp being blown against the gauze, which will invariably happen when proceeding against the current. Not only is there a chance of burning out the gauze in that case, but gas may be ignited should an explosive condition of the air develop unexpectedly.

TEXTBOOKS ARE USUALLY ACCEPTED AS DEPENDABLE BY MINING MEN

Let me add that our textbook methods of doing things are generally reliable, being the result of the observations of practical men. The idea so often expressed that textbooks are pure theory is rapidly meeting with disfavor among intelligent men who possess practical mining experience. However, there are many questions that arise in mining practice, the answers to which depend entirely on local conditions, and no hard-and-fast rule can be given to determine the practice in such case. Following are a few such questions:

Which should be the largest, the intake or the return airway in a mine?

Which is the more efficient, a force or an exhaust fan?

In sealing off a mine fire, should the intake or the return end of the section be closed first?

When making his examination of a mine, should the fireboss travel with the air or proceed against the current?

My experience as a mine official and instructor in the principles and practice of mining has led me to urge students to consider carefully each side of these and similar questions before laying down a hard-and-fast rule for general application. In firebossing in a gaseous mine, however, I do not hesitate to advise that the best mining practice, in the absence of known extraordinary conditions, is to begin the examination at the intake end of the mine or section and proceed with the air current.

R. Z. VIRGIN,

Assistant Professor of Coal Mining, Carnegie Institute of Technology, Pittsburgh, Penn.

Preservation of Mine Timber

Letter No. 3.—I was interested in reading the letter of C. McManiman, COAL AGE, Sept. 11, p. 459, and am tempted to offer a few remarks giving my own experience in the matter of preserving the life of mine timber, especially timber used on main roads, travelingways and air-courses in mines.

Since it is the air of the mine that, penetrating the pores and the seams of the timber, causes it to decay or induces dry rot, any method that will keep the air from thus penetrating the wood will preserve the timber and lengthen its life.

In my judgment, the common black paint that is so largely used in mines for the purpose of preserving iron makes a good coat or covering for the protection of mine timber when properly applied after the bark has been removed from the timber. This will not prove an expensive operation, as the paint is cheap and quickly applied. It will generally be found to pay in reducing the outlay for timber on the roads.

It is unnecessary to attempt to preserve timber used in long-wall work and in rooms and in pillar workings, as the life of such timber is short at the best. On the other hand, a great saving is accomplished by doing what we can to prolong the life of the timber used on main roads, travelingways and air-courses, which must be retimbered frequently when no means are adopted to preserve the timber from dry rot and decay.

I am under the impression that sufficient care is not taken generally by those who have charge of the prop yards at collieries. A large saving can be effected by arranging the distribution of timber in the yards so that it is not kept on hand an indefinite period, but is sent into the mine regularly as needed.

BEST WOOD IS CUT IN MIDSUMMER

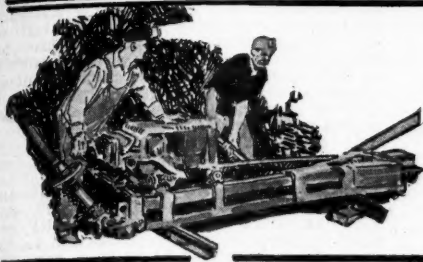
Just here, I want to state my opinion that the best mine timber is that which has been felled and cut during the midsummer months, when the trees have attained their fullest strength, the bark is toughest and the sap strongest in the wood. I know that this is contrary to the advice generally given in textbooks to the effect that mine timber should be cut in the winter months when the sap has ceased to run in the tree; but it is my belief that mine timber should be full of sap and not stripped of its bark, except for the purpose of applying a protecting coat of paint such as I have mentioned. In my experience, crossbars and props live longest in the mine and show a greater resisting power when the timber is full of sap and the bark entire.

To test this question further, I consulted two mine foremen, one an older man having 10 years' experience in the coal mines of England and about 20 years in handling timber in and around the anthracite mines of Pennsylvania; the other, a practical young foreman who has passed through all the grades of mining from slate picker to foreman. To these men I stated the case plainly, asking them what timber in their judgment was the best to use for crossbars and props in mines, that with the sap in the wood and the bark protecting it, or timber free of sap and bark; in other words, well seasoned timber. Without hesitation, both of these men replied that the timber with the bark on and full of sap was the best to use for any purpose whatever.

Of course, I felt that this would be their answer, as it agreed with my own experience with mine timber. Speaking of the different qualities of some woods, let me say that chestnut makes as durable a mine timber as oak, and does not decay as quickly under the same conditions in the mine. It has nearly the same resisting power or strength as oak. My experience is that chestnut, oak and pine timber make the best crossbars, while ash and hickory are very serviceable for longwall work and in drawing back pillars.

Pittston, Penn.

J. HENNIGAN.



COAL AND COKE NEWS



Fairmont, W. Va.

In anticipation of strike, northern West Virginia fields speed up production. Operators swamped with orders. Prices advance. Railroads make special effort to secure additional fuel. Pay prevailing prices. Pronounced increase in shipments, both east and west.

While the car supply in northern West Virginia fields was somewhat uncertain during the week ended Oct. 25, yet, taking the week as a whole, production was fairly well sustained. The most acute shortage during the weekly working period developed on the twenty-third, when there was only about a 50 per cent supply, that applying to the Baltimore & Ohio, Monongahela and other railroads. Every effort was being made by producers to speed up production as much as possible, so as to reach the markets with the maximum amount of fuel before the strike order became effective. It was generally believed in the Fairmont and other northern West Virginia regions, that a strike was certain unless the Federal Government stepped in, and while northern West Virginia operators had made up their minds to make no effort to operate after Nov. 1, in the event of a strike, still they were anxious to get out as much coal as possible before the first, a task in which they succeeded for the most part.

The certainty of a strike of course, spurred buyers to the necessity of securing a supply of coal over and above ordinary requirements, and consequently northern West Virginia producers were swamped with additional inquiries and orders. It was possible to take care of only a limited amount of additional orders owing to contract requirements. Prices advanced in some instances as much as 75c a ton.

Railroads were making a special effort to secure additional fuel, claiming that they could not handle coal except with enough fuel with which to operate; therefore, a special effort was made by producers to meet the increasing requirements of railroads, which it is understood are paying prevailing prices. Shipments to the West grew in volume, naturally, in view of the demand developed in that part of the country as a result of strike talk. There was also a pronounced increase in the volume of tidewater shipments.

Charleston, W. Va.

Car shortage and labor troubles in the high volatile fields cause low ebb in production. Tidewater embargoes sent high volatile West. New River mines not hampered by labor troubles as in the Kanawha region. Smokeless in great demand, but contract orders absorb the output.

Conditions were far from satisfactory in the high volatile fields, or at least in the organized portion of such fields during the week ended Oct. 25, production reaching a low ebb partly because of an inadequate car supply and partly because of labor troubles which have become chronic in the last two months. At the outset of the week the car supply was fair and a promise was made that it would improve as the week progressed. This it failed to do so that by the end of the weekly working period, the empties available had dwindled to such an extent that a number of mines were precluded from operating because of a total absence of cars.

Embargoes were still in force as to eastbound shipments from the high

volatile fields; coal that would have been consigned to tidewater was shipped west and was accepted with avidity, owing to the growing demand for fuel in Western markets. As the strike clouds loomed blacker and blacker, many buyers were seeking cover and there was a sharp increase in the demand for both smokeless and high volatile fuels; yet in neither case was it possible for producers to afford much relief owing to a curtailed production due to causes already described.

It was regarded as certain that the miners in both a portion of the organized high volatile and smokeless fields would join the miners of the Central competitive field in a strike, in case the strike order should not be rescinded. While producers were anxious to speed up production before Nov. 1, both transportation disabilities and wilful hampering of production on the part of the miners precluded them from doing so.

With numerous mines on Cabin Creek and on Coal River (both in the Kanawha district) shut down, either throughout the week or at least a part of the week, production in the Kanawha region was even below that of the previous week. Radicals once again sought to organize another armed invasion of the Logan field and did succeed in forcing a suspension of several mines on Cabin Creek for several days; at one mine they succeeded in forcing all miners to agree not to work until November 1. While they endeavored to organize a large gathering at Cabin Creek Junction, from which point the armed march on the Guyan field was to be started, they only succeeded in persuading a few hundred miners to turn out, and the latter were forced to give up their plans in response to orders from the district and national president of the organization.

In addition to labor troubles operators were handicapped by particularly poor car supply, especially during the latter part of the week, empties from the Lakes failing to materialize. That was the only direction from which they could come owing to an embargo on eastbound coal freight. Up until Oct. 20 the prospects of a strike had not seemed to stimulate the demand to as great an extent as might have been imagined. Beginning on that date, however, there was a good deal of scurrying around for coal and there was a very pronounced increase in the demand in the Kanawha region. At the same time prices underwent a change, the advance amounting to about 25c a ton.

New River mines were hampered by no such labor troubles as stood in the way of a larger production in the Kanawha region, but production was still a good deal below normal in the New River district; principally because of the inability of the mines to secure as many cars as were needed, although the first of the week found mines fairly well supplied. During the last half of the above period, however, cars were a good deal more scarce and mines were much handicapped in meeting the demand, particularly at tidewater for smokeless coal, there being no embargo against that kind of fuel. As might have been expected there were Macedonian calls for smokeless over and above the demand recently prevailing, but producers were so rushed with contract orders as to make it next to impossible to come to the rescue with any additional fuel, even though prices reached a general level of at least 50c a ton above recent quotations.

Huntington, W. Va.

Mine disability principal cause of decrease in production in Guyan field. Car shortage also occasions loss of tonnage. Capacity of Logan mines 350,000 tons a week. Unorganized fields to supply country with fuel during strike.

Production underwent a slight decrease in the Guyan field during the week ended Oct. 25 as compared with the previous week, the difference amounting to 5000 tons; this despite the fact that the car shortage was not running quite so large in tons (though larger in percentage) as compared with the previous weeks, mine disability being the principal factor in reducing the output. Still there was a loss of 26 per cent and of 84,227 tons from lack of cars. However, even with the output reduced to 216,000 tons, that was 50,000 tons in excess of production for the corresponding period of 1918, when the influenza epidemic interfered so seriously with production.

As the full time capacity of Logan mines is in the neighborhood of 350,000 tons a week, it is believed that plants in this field will be able to come within a fair degree of reaching such production, when other mines are closed down and cars are more plentiful. At least a determined effort will be made to materially increase production with a view to supplying as much of the demand as possible, as it is realized by Guyan operators that the burden of supplying the country with fuel, for a time at least, will rest upon the unorganized fields.

Owing to the fact that fully 60 per cent of the output has been required to take care of contracts, Guyan producers have not been able to meet a very large proportion of the extraordinary demand which has arisen in connection with the strike, which will have become effective before this report appears. While prices had advanced in the Guyan field, operators in that field were making an effort to keep prices in leash as much as possible.

The tonnage of coal handled on the Chesapeake & Ohio system was increased during the week ended Oct. 25, as compared with the previous week, reaching a total of 13,259 cars; whereas during the previous week the movement had only reached a total of 645,000 tons.

Bluefield, W. Va.

Slight gain in tonnage in Pocahontas field. Car supply improved. With organized mines closed down, car supply is better and tonnage increase in proportion. Production speeds up in Williamson field. Output highest of the year. Conditions ideal for large tonnage.

While Pocahontas producers managed to regain a little lost ground, the gain was quite slight amounting to only 4,000 tons, the output being increased from 299,000 to 303,000 tons. Although a greater number of hours were worked during the week ended Oct. 25 than during the previous week, there was not a proportionate increase in production. There should have been a much larger gain in view of the fact that the car shortage was reduced to the extent of 19,000 tons, or from 182,000 to 163,000 tons. Coal coked amounted to 11,000 tons, or just about the same tonnage recorded during the previous week.

Owing to the limited production, mines in the Pocahontas region were unable to do much toward supplying the country with additional fuel, finding it necessary first of all to take care of regular customers. It was generally expected, however, that with organized mines closed down for the most part, it would be possible to secure a better car supply, and that, under such circumstances, it would be possible for the Pocahontas district to assume its share of the burden of furnishing its country with fuel.

Much progress was made in the Williamson field in speeding up production, the output for the week ended Oct. 25 being 140,000 tons, the highest for the year and 32,000 tons in excess of the output for the same week of the previous year. This improvement was due in part to a slightly reduced loss in car shortage and also the loss of a less number of tons from a labor shortage. Labor conditions are ideal for a large production here during the strike, and Williamson operators are making every preparation to get out a large tonnage during the continuance of the strike, having every reason to believe that a better car supply will enable them to do so.

Alberta, Canada

With the object of establishing a coal reserve, the Dominion Government, by order-in-council, has withdrawn from location a large area of coal land near the junction of the Muskeg and Smoky rivers, in the northern part of this province. The area is situated within 70 miles of railway communication and contains a number of large seams of bituminous and semi-anthracite coal. It is probable that a survey for a railway to connect the area with the Canadian Government railways will be made in the spring.

PENNSYLVANIA

ANTHRACITE

Shamokin—High officials of the Philadelphia and Reading Coal and Iron Company, after an inspection trip here, announced that a new shaft and million-dollar breaker will be erected at the Big Mountain colliery near here. This will be the last work in modern coal mining practice according to Superintendent John Hardesty. New coal seams, as yet untouched, will be reached which will mean a great increase in production at this colliery.

Hazleton—Owing to the scarcity of houses here and in the surrounding towns, due to cessation of building during the war, the Lehigh Valley Coal Co. is ordering out tenants from its properties who do not work for this corporation. This is done so that employees can be accommodated. It is said that there never was such a demand for dwellings as exists at present.

Pottsville—Judge Bechtel handed down an order recently in which the Raven Run Coal Co. wins title to a colliery near Shenandoah, which was claimed by the Girard Mammoth Coal Co.

WEST VIRGINIA

Charleston—The Chesapeake & Ohio R. R. has been obliged to enter the market for coal following the issuance of an order directing the road to cease giving mines furnishing coal to it, the preference in the distribution of cars. This fact has been brought out through a letter from the fuel purchasing agent of the road at Richmond, Va., addressed to coal operators in this section, in which the statement is made that the company is compelled to arrange for a supply of fuel outside of the tonnage under contract, owing to the fact that contract-fuel mines have not developed the tonnage expected. The Kanawha Shippers' Association is contemplating making a request that the mines, which were demanding their fair share of cars while the C. & O. was giving its contract mines preference, be given a supply sufficient to make up for the loss, over and above their regular rating.

Charleston—With more than 70 operators in attendance, the annual

meeting of the Kanawha Operators' Association was held in this city on Friday, Oct. 17, officers being elected for the ensuing year. The association also gave its attention not only to problems immediately affecting them but to other questions of national importance in the coal industry. The session of the general meeting was brought to a close with a luncheon, at which D. C. Kennedy, secretary-commissioner of the association was presented with a handsome gold watch signifying 15 years of continuous service with the association, the presentation being made by Quin Morton, newly elected president of the association. Officers chosen by the association were: Quin Morton, Charleston, president; W. C. Mitchell, of Plymouth Coal Mining Co., Plymouth, vice president; P. L. Dickinson, Quincy Coal Co., Charleston, W. Va.; D. C. Kennedy, secretary-commissioner, Charleston, W. Va.

OHIO

Macksburg—Another mine is to be opened near here about the first of the year, according to an announcement of the H. C. Snyder Co., of New Philadelphia. A shaft is to be sunk on the Leland Longfellow farm about a half mile north of this place. A tippie is to be constructed at a cost of \$65,000 to \$75,000. The output of the mine is expected to be approximately 800 tons of coal a day, when the plant is in full operation. A complete electrical power and lighting plant will be installed. This company has its main office in Cleveland.

KENTUCKY

Ashland—A largely attended meeting of the Northeast Kentucky Coal Operators' Association was held in this city on Wednesday, Oct. 29, all parts of the district being represented. One of the principal attractions was an exhibition of the film "The History of Coal" loaned by the National Coal Association. The routine of the days sessions was broken by a most enjoyable luncheon. Among several speakers present at the meeting was F. J. Gum, chairman of the Chesapeake & Ohio Allotment Commission. Mr. Gum addressed himself to the subject of car allotment and distribution.

The subjects under consideration at the meeting were: The labor situation and the threatened strike of bituminous miners; car supply and allotments; collective purchasing department; uniform monthly cost sheets; improved railroad, telephone and telegraph service up Big Sandy; community welfare work; compensation insurance.

ILLINOIS

Benton—Four men who robbed the Middle Fork mine (last June) of \$42,000 after wounding two of the mine's employees, have been sentenced to serve from 10 years to life in the penitentiary. The four men are: Angelo Trini, Albert Trini, Antonio Ferneti and Riso Lubin. A fifth man, Nalo Fertigatto, was killed by an employee of the mine in an attempted escape. The other four men were captured several hours after the holdup in a nearby woods after a revolver fight with 200 residents of Benton. The men have been held in the St. Clair County jail at Belleville, Ill., as it was feared that they would be lynched at Benton.

Carterville—Application has been made before the State Public Utilities Commission for a certificate of convenience and necessity, to build an electric railroad from Davenport, Iowa, to Metropolis, Ill. The commission has not given its decision on the matter. It is said that the building of this line would greatly facilitate the marketing of southern Illinois coal in the Northwest. The promoters state that the line will be built and equipped for heavy freight service in event of its construction.

Mt. Vernon—It is stated that a large acreage of coal has been contracted for in the western part of Jefferson County and that steps will be taken immediately to prove the field. The contracts are said to have been signed and a considerable sum of money de-

posited to insure the carrying out of the contract by the purchasers. This coal field covers a large portion of Blissville, Casner, Shiloh and McClellan townships. It is understood that it is the intention of the parties interested in buying this field to develop it in the near future should the coal prove satisfactory.

INDIANA

Anderson—The American Steel and Wire Co. has informed its 800 employees that the company will sell coal to employees contributing to the support of families at \$4.30 a ton. The coal, which is said to be a good grade for domestic use, will have to be hauled by the mill employees. The mill has probably the largest stock of coal in Madison County, Indiana. Last winter the mill relieved a general shortage by selling several hundred tons of coal through the fuel administrator.

NEBRASKA

Omaha—A municipal coal department has been opened at the city hall here. Colorado coal will be offered for cash at \$8.50 per ton.

MONTANA

Billings—One of the largest deeds recorded in Yellowstone County was filed here recently. It was a warranty deed from the Bull Mountain Coal and Realty Co., of Eau Claire, Wis., to the Bull Mountain Coal and Realty Co., of Billings, Montana. The transaction involved \$450,000 in addition to any encumbrances there might be on the property. The sale involves almost 12 sections of coal in the Bull Mountain district east of Billings, acquired several years ago by the Wisconsin corporation. The new company intends to start development work on its holdings in the near future.

NEVADA

Tonopah—J. D. Darms, president of the Darms Coal Mining Co., who has been in charge of operations for the company in the Coaldale section for several years, is arranging for the resumption of work at his mines. Mr. Darms states that it is his plan to continue the main shaft an additional 100 ft., expecting to strike a new seam of coal in that distance. In that event the shaft will have a total depth of 640 feet.

Industrial News

Charleston, W. Va.—Construction work on two large plants of the Raleigh-Wyoming Coal Co. is to be in charge of Carl Scholz, consulting mining engineer, who has been engaged for some time in supervising the construction of mining plant for the Chicago, Burlington & Quincy R. R. Co. Offices will shortly be opened in Charleston by Mr. Scholz and construction operations directed from here, it being the intention of Boston capitalists who are behind the new company to establish one plant at Raleigh and one in Wyoming County. The plant in Raleigh will be at Manatus and is to be a drift mine in the Eagle seam with a capacity of 3,000 tons of coal a day. It is stated that it will require about 18 months to construct the Manatus plant. The Wyoming mine is to be at McGraws and will have a capacity of 5,000 tons a day. A shaft is to be sunk 600 ft. to the Pocahontas seam. It will require two years to have the shaft mine ready for operation. The property consists of 9,000 acres of coal land.

Louisville, Ky.—The Sun Coal Co., recently incorporated in Louisville with a capital of \$100,000, by C. F. Lowther, J. W. McCulloch and others, has recently leased mines of the Manchester Coal Co., Manchester, Clay County, Ky. The new company has purchased a commissary store at that point and has also bought outright the mines of the Flat Lick Coal Co., at Flat Lick, in Knox County. Deals are pending for mines in other eastern Kentucky counties and for some western Kentucky mines. The output of the company's mines will be handled through the Allied Coal Co.

Clarksburg, W. Va.—Rapid progress is being made by the Cornog-Carrington Colliery Co., in which Philadelphia capitalists are largely interested, and which was organized only a short time ago. The company is building a large plant near this city on the Parkersburg division of the Baltimore & Ohio where the company owns a tract of Pittsburgh coal. Approximately two months will be required to finish work on the plant which will represent an expenditure of about \$100,000, including electrical equipment, the usual mine buildings and dwellings for miners as well as 2,800 ft. of tram-way. The company expects to begin using about 150 miners by Jan. 1 and to produce coal at the rate of 1,000 tons a day. H. M. Sipe is not only supervising all construction work but will be in charge of operations as general manager. The largest stockholders in the new company are H. K. Cartwright and H. B. Conor, of Philadelphia and J. G. Eby, of Portage, Pa.

Louisville, Ky.—The Sun Coal Co., recently incorporated in Louisville with a capital of \$100,000 by C. F. Lowther, J. W. McCulloch and others, has recently leased the mines of the Manchester Coal Co., Manchester (Clay County), Ky. The new company has purchased a commissary store at that point and has also bought outright the mines of the Flat Lick Coal Co., at Flat Lick, in Knox County. Deals are pending for mines in other eastern Kentucky counties and for some western Kentucky mines. The output of the company's mines will be handled through the Allied Coal Co., a selling organization which controls the Sun Coal Company.

New York, N. Y.—The Ingersoll-Rand Co., of this place, announces that the industrial growth of Texas and Oklahoma and the large demand made for modern machinery in this and other lines, has led the company to establish a branch office in the Sam Houston Life Building, Dallas, Texas, which will be in the charge of R. H. Brown, Jr., as manager. Mr. Brown has heretofore been connected with the company's St. Louis office and has, for years, been in intimate touch with the Texas-Oklahoma territory.

Charleston, W. Va.—The Pilgrim Land and Coal Co., of Chattooga, W. Va., has been incorporated to operate mines in Kentucky; capital stock \$50,000; incorporators, M. C. Ingham, R. H. Campbell, W. E. Morgan, M. A. Emmons, of Chattooga, and A. D. Runyon, of Delorme, W. Va.

Princeton, W. Va.—The building of a branch line by the Virginian Ry. from Maben on its main line into the Milam Fork district of Wyoming County, W. Va., will make possible the development of a considerable acreage of Pocahontas coal. Some 30,000 acres in the Milam Fork area are owned by the Wyoming Pocahontas Land Co., headed by Andrew Squires, in which Cleveland capitalists are largely interested.

Huntington, W. Va.—Holdings in Wayne and Mingo counties, W. Va., will be developed by Huntington men who have formed the Wilson Thacker Coal Co., a \$50,000 corporation. No time will be lost in completing arrangements for the beginning of operations. While the new company will operate in the territory mentioned, the general offices of the company will be at Huntington. Prominently identified with the new company are Walter C. Williams, E. M. Pyle, A. R. Mulers, P. K. King and John Bowman.

Charleston, W. Va.—The plant and property of the Barren Creek Coal Co., at Barren Creek, on the Coal & Coke Ry. near Clay, W. Va., has been transferred to the Barren Creek Colliery Co., the latter company having just been organized by John B. Hart, of Charleston, head of the Hartland Colliery Company. Two separate tracts of coal were acquired—one of 100 acres and another of 307 acres, both in Big Sandy district, on Elk River.

Carlinville, Ill.—On Oct. 25, shaft A of mine No. 1 of the Standard Oil Co., broke all records at the plant by hoisting 1311 tons of coal or 1034 cars. This is a splendid record when the equipment that is in use is considered. All of the cars were hand dumped and caged. The hearty co-operation of all men at the plant was given in making the new record.

Grafton, W. Va.—Within two months the Jenkins Coal Corporation expects to have a mine in operation in Wilson district of Upshur County, this company having just been organized with a capital of \$25,000. The plant will ultimately have a capacity of 100,000 tons a year. The company announces it will be in the market for a quantity of 20-lb. steel rail, a steam, gasoline or kerosene locomotive and loading aprons. Operations will be superintended by Earl Jenkins. Principally interested in the new company are Captain F. P. Rease, Anna C. Rease and Earl B. Jenkins, of Belington, Martha E. Jenkins and G. H. A. Kunst, of Grafton, W. Va.

Charleston, W. Va.—Headquarters have been established by the Kelly's Creek Colliery Co. as well as by the Valley Camp Coal Co., in Charleston, offices having been secured in the Kanawha Banking and Trust Co. Bldg. C. S. Paisley is the office manager. The Valley Camp company was only recently organized.

Welch, W. Va.—The Link-Belt Co., of Philadelphia, has just been awarded a large contract for the complete installation of a modern coal tipple and retarding conveyor by the Mohawk Coal and Coke Co., at Mohawk, W. Va. Col. L. E. Tierney, president of the Mohawk company, is also interested in a number of other modern collieries in West Virginia and Kentucky. In order to properly clean and prepare coal for market this company decided to replace the present old structure with a plant of the most modern design. The new equipment will include automatic machinery throughout for handling about 2,000 tons of coal daily, from a seam at the top of the mountain or from one midway along the conveyor. The conveyor will deliver coal to a 750-ton coaling station or to the new tipple.

Charleston, W. Va.—T. E. B. Siler and others of this vicinity have organized the Posler Coal Co., which will operate mines on an extensive scale in the Kanawha field, this company having a capital of \$120,000. So far as can be learned construction work will be started in the near future on this plant. Identified with this company were, in addition to Mr. Siler, C. G. Peters, J. L. Siler, Fred O. Blue and R. E. McCabe.

New York, N. Y.—The Ingersoll-Rand Co., of this place, announces that the industrial growth of Texas and Oklahoma, and the large demand made for modern machinery in various lines, has led the company to establish a branch office in the Sam Houston Life Building, Dallas, Texas, which will be in the charge of R. H. Brown, Jr., as manager. Mr. Brown has heretofore been connected with the company's St. Louis office and has for years, been in intimate touch with the Texas-Oklahoma territory.

Charleston, W. Va.—The Pinnacle-Pocahontas Development Co., Thos. H. Mordue, president and treasurer, has recently closed a lease with the Morris Smokeless Coal Co., of 1625 acres of No. 3 Pocahontas smokeless coal land near Nerndon, W. Va., on the main line of the Virginian railroad. The lessee will begin the construction of an up-to-date mining plant and town immediately, and expects to be shipping coal within three months.

Weston, W. Va.—Plans of the Coal Land Development Co. for the operation of coal mines presage quite a large operation in the southern part of Lewis County. At the point mentioned the company has started construction work on a large plant; the company proposes to equip the mine with the most modern and efficient machinery with a view to securing a large production. Work on grading a sidetrack has been completed and general construction work is being pushed on the plant as a whole.

Fairmont, W. Va.—The Winfield Coal Co., will establish operations in Winfield district, of Marion County, W. Va., this concern having just been organized with a capital of \$25,000. Plans are being made for early operation. Represented as incorporators were: R. B. Satterfield, of Lumberport, W. Va.; G. B. Hartley, T. W. Powell, Alpha Orr and Paul G. Armstrong, all of Fairmont.

Morgantown, W. Va.—The sale of the Elkins Coal and Coke Co. with mines and coal properties in Monongalia and Preston counties, to the Bethlehem Steel Co., was ratified by the directors of the Steel Corporation recently. This not only marks one of the biggest coal deals in recent years in northern West Virginia, but it also means a change in ownership of approximately 23,225 acres of coal land in Monongalia and Preston Counties. Furthermore nine mines operated in those two counties are included in the deal, these mines having a daily capacity of 61 cars of coal and 19 cars of coke. The Elkins Coal and Coke Co. has been operating since 1902, when it was organized by the late Stephen B. Elkins. While four mines are operated in Monongalia County, the important holdings of the company were on the Monongalia-Preston line, where the company owned about 22,000 acres of Freeport coal. It seems to be pretty generally understood that following its purchase of the Elkins Coal and Coke Co., at a price approximately \$4,000,000, the Bethlehem Steel corporation will construct byproduct plants at two or more points on the Morgantown & Kingwood Railroad.

Charleston, W. Va.—The Kanawha Smokeless Coal Co. has just been organized for the purpose of engaging in the business of mining coal in Raleigh County; although the new concern, which has an authorized capital of \$1,000,000, has not so far made any actual purchase of land. Principally interested in the new company are: R. W. Steele, of Pittsburgh, Pa.; Geo. F. Auld, of Washington, Pa.; Geo. C. Mitchell, of Philadelphia; M. E. Moore and C. H. Hetzel, of Charleston, W. Va.

Victoria, B. C.—By order-in-council the Dominion Government has withdrawn location privileges with respect to a tract of land near the junction of the Muskeg and Smoky rivers in northern Alberta. Large deposits of high grade coal, both bituminous and anthracite, are reported to occur in this area. The coal is only 70 miles distant from railway communication.

Huntington, W. Va.—The Phillips Mining Co., of Huntington, was incorporated with a capital stock of \$150,000. The incorporators are R. C. Phillips, E. J. Phillips, B. L. Douglas, J. Boman, W. Williams of Huntington.

New York, N. Y.—The Chesapeake Iron Works, of Baltimore, Md., manufacturers of the Chesapeake electric traveling cranes, has recently announced the opening of its New York office in the Woolworth Building. The office will be in charge of H. L. Mode.

Birmingham, Ala.—The Tennessee Coal, Iron and Railroad Co. recently opened to the public their new hospital building at this place. The structure is modernly equipped throughout with its own power house and ice-plant. Dr. Lloyd Noland is the chief surgeon.

Louisville, Ky.—The Hazard Coal Operators Association held a meeting in Cincinnati on Oct. 25, to discuss general conditions, this being a quarterly meeting. Operators reported that the Hazard field is not organized, and that no strike is to be expected.

Pinckneyville, Ill.—The Illinois Sixth Vein Coal Co. has installed a 75 k. w. Western Electric generator, direct-connected to a Chuse single valve engine. Other equipment recently purchased includes a Sullivan short-wall cutting machine.

Charleston, W. Va.—The Posler Coal Co., of this place, was incorporated with a capital stock of \$120,000. The incorporators are: T. E. Siler, R. E. McCabe, C. G. Peters, J. L. Siler, F. C. Blue, all of Charleston.

Odin, Ill.—Odin Coal Co., has purchased a Jeffrey fan, driven by an adjustable valve Ridgway engine. The installation will be completed as soon as the engine is delivered.

Percey, Ill.—Willis Coal Mining Co. are installing a new shaking screen and steel supporting structure. The new apparatus will have a daily capacity of 2000 tons.

Sesser, Ill.—The Southern Gem Coal Co. are adding two Sterling boilers to their equipment. An additional 10-ton locomotive has been purchased from the General Electric Co.

Freeport, Ohio—The Crab Orchard Mining Co., organized some time ago and with headquarters in Columbus, will soon start operating on its property on the Baltimore & Ohio railroad, near this place. The property has two workable seams of coal, No. 7 and No. 7-A. A tippie has been erected and a railroad connection built. E. E. Learned, formerly sales manager of the Hisylvania Coal Co., is secretary and manager; R. C. Hastings, president of the International Telephone Co., is president.

Columbus, Ohio—The announcement is made that E. M. Poston, president of the New York Coal Co., has purchased a controlling interest in the Ohio Electric Securities Co., which operates a large power plant at Floodwood, Ohio, supplying many mines in the Hocking Valley field with electric current. The deal was closed by C. G. Hanes, representing English holders. The company also operates a similar power plant at Pomeroy and Middletown in the extreme southern Ohio field.

Scranton, Pa.—It is stated that the Von Storch mine of the Delaware & Hudson Coal Co., in this city, was sold recently to the Mid Ridge Coal Co., \$2,000,000 figuring in the transaction. New York and Philadelphia capitalists are said to be interested. The mine is considered one of the fine producers of this part of the anthracite field. L. H. Conklin and Warren Acker, of Scranton, are the principal members of the Mid Ridge concern.

Columbia City, Ind.—Several thousand acres of land have been leased in Washington Township of Whitley County (in northern part of state), south of this place, by a Terre Haute coal concern. This company has a drill on the Ingram Merriman farm and will drill at other places soon in a search for minable coal.

Beallsville, Pa.—Charles Miller, of this place, recently closed a large coal deal in West Pike Township. Mr. Miller sold to J. H. Hillman, Jr., of Pittsburgh, the Pittsburgh seam of coal underlying two tracts of land in the township noted; the first was a tract of 289.865 acres and the other of 10.875 acres. The consideration was \$371,000.

Charleston, W. Va.—The Wayne Steam Coal Co., of Philippi, was incorporated with a capital stock of \$75,000. The incorporators are: G. W. Newcomer, Connellsville, Pa.; A. G. Newcomer, Dawson, Pa.; Lou Cunningham, Bellevue, Pa.; H. R. Hurst and R. H. Parker, both of Scottsdale, Pa.

Charleston, W. Va.—The Concord Coal Co., which has just been organized by Charleston men, will have its principal works in Nicholas and Clay counties of West Virginia, with headquarters at Charleston. The concern is capitalized for \$100,000.

Baltimore, Md.—The Phyllis Coal Mining Co. has been incorporated with a capital stock of \$600,000 by John C. Lewis, Wm. E. Ferguson and Chas. B. Bosley. The principal office of the concern is given as 16 E. Lexington street, Baltimore.

Charleston, W. Va.—The Hepzebah Coal Co., of Clarksburg, W. Va., has been incorporated to operate mines in Harrison County; capital stock, \$100,000; incorporators, George H. Hoffheimer, E. Bryan Templeman, Robert B. Stotler, Thomas R. Craig and Nellie Costall, of Clarksburg.

Charleston, W. Va.—Capitalists of Buffalo, N. Y., have chartered the Daventport Coal Co. here for developing coal land in this state. The capitalization is \$300,000, and the incorporators include M. E. Preich and W. H. Farnsworth.

Philadelphia, Pa.—Philadelphia and New York capitalists are said to be interested in a proposal to form a corporation to take over part of the coal and oil holdings of E. B. Carr, of this city, in Morgan County, Kentucky. The property includes about 76,000 acres.

Charleston, W. Va.—The Fairmont City Gas Coal Co., of Fairmont, has been incorporated with a capital stock of \$300,000. The incorporators are Thomas R. Cunningham, Connellsville, Penn.; A. J. Salzer, Weston; S. V. J. Bartus, Pittsburgh; H. H. Stagers, Chas. E. Hawkes and Rollo J. Conley, all of Fairmont.

Grafton, W. Va.—Within two months the Jenkins Coal Corporation expects to have a mine in operation in Wilson district, of Upshur County, this company having just been organized with a capital of \$25,000. The plant will ultimately have a capacity of 100,000 tons a year. The company announces it will be in the market for a quantity of 20-lb. steel rail, a steam, gasoline or kerosene locomotive and loading aprons. Operations will be superintended by Earl Jenkins. Principally interested in the new company are: Captain F. F. Rease and Earl B. Jenkins of Beilington, W. Va.; Martha E. Jenkins and G. H. Kunst, of Grafton, W. Va.

Huntington, W. Va.—Holdings in Wayne and Mingo counties, W. Va., will be developed by Huntington men who have formed the Wilson Thacker Coal Co., a \$50,000 corporation. No time will be lost in completing arrangements for the beginning of operations. While the new company will operate in the territory mentioned, the general offices of the company will be at Huntington. Prominently identified with the new company are: Walter C. Williams, E. M. Pyle, A. R. Muirs, P. K. King and John Bowman.

Ligonier, Pa.—Coal and timber land totalling 833 acres, located in Westmoreland County, near here, have been sold by F. E. Thomas of Beaver County, to W. F. Blair, senator from Waynesburg, Pa. The consideration was \$650,000; this represents about \$780 an acre.

Cleveland, Ohio—The Astel Coal Co. has been chartered with a capital of \$100,000, by E. W. Astel, C. N. Fiscus, M. R. Burridge, E. L. Perkin and C. F. Taplin.

Personals

Colonel Harley B. Ferguson, United States Engineer in charge of the Pittsburgh district, is now engaged in gathering information for the survey of the Monongahela River. It is hoped that Congress will at once act and appropriate a sufficient sum of money to begin and complete the improvements asked for by river interests.

E. W. Blower, who served with the American Expeditionary Force, has returned and assumed the position of sales manager of the Hisylvania Coal Co., a position recently made vacant by the resignation of E. E. Learned. The latter has taken up the operating end of the business of the Crab Orchard Mining Co.

Obituary

William Beury, a prominent coal operator of southern West Virginia, died at his home in Philadelphia on Oct. 28. Mr. Beury was born May 19, 1844. He was one of the New River and Pocahontas pioneers in the coal business, starting in the former field in 1878. He had large coal interests in Fayette and McDowell counties. He was a brother of C. C. Beury, of Charleston, W. Va., and also of the late Colonel Joseph Beury, of Fayette County, W. Va.

Trade Catalogs

Air Lift Pumping—Ingersoll Rand Co., New York. A 6-page folder; 3½ x 8½ in.; illustrated. Illustrating an air lift installation.

The Clutch That Clutches—Medart Patent Pulley Co., Inc., St. Louis, Mo. Booklet. Pp. 16; 3½ x 8½ in.; illustrated. Describes the Medart friction clutches.

Typical Graphic Records—The Esterline Co., Indianapolis, Ind. Pp. 24; 8½ x 11 in.; illustrated. Description of Esterline instruments and comments on some typical records.

Portable Outfits for Oxy-Acetylene Welding and Cutting—Davis-Bournonville Co., Jersey City, N. J. Pp. 8; 8½ x 11 in.; illustrated. Description of the three types of apparatus made by this company.

Air Life Compressors—Ingersoll Rand Co., New York, N. Y. A 3-page folder; 3½ x 8½ in.; illustrated. Gives a few facts why it "Tis a Good Investment" to buy the best air compressors.

Centrifugal Pumps—Sales Service Data. The Goulds Manufacturing Co., Seneca Falls, N. Y. Pp. 36; 7¼ x 10 in.; illustrated. Information on the theory, design and testing of centrifugal pumps.

Roberts & Schaefer Complete Coal Mining Plants—The Roberts & Schaefer Co., Chicago, Ill. An 8-page folder; 8½ x 11 in.; illustrated. Views of plants constructed by the R. & S. company.

Production of Explosives in the United States, by Albert H. Fay. For the year 1918. Technical Paper 231. Unillustrated; pp. 21; 5½ x 9½ inches.

Miscellaneous Applications of Electrical Heat—The Cutler Hammer Manufacturing Co., Milwaukee, Wis. Folder 479. Pp. 4; 8½ x 11 in.; illustrated. Description of space heaters.

Electrical Operation of Gate Valves, by P. F. Dean. Booklet distributed by The Cutler Hammer Manufacturing Co., Milwaukee, Wis. Pp. 8; 8½ x 11 in.; illustrated. Description of the Dean system.

An Analytical Method of Detecting Blown-Out Shots in Coal Mines, by G. F. Hutchinson and Jacob Borab. Department of the Interior. Bureau of Mines. Technical Paper 210. Unillustrated; pp. 22; 5½ x 9½ inches.

Peat in the Dismal Swamp, Virginia and North Carolina, by C. C. Osborn. Bulletin 711—C. Department of the Interior. U. S. Geological Survey. Illustrated; pp. 41-59; 5½ x 9½ inches.

Dangerous and Safe Practices in Bituminous Coal Mines, by Edward Steidle. Department of the Interior. Bureau of Mines. Miners' Circular 22. Practically all illustrations; pp. 110; 5½ x 9½ inches.

Why and How Coke Should Be Used for Domestic Heating, by Henry Kresinger and A. C. Fieldner. Department of the Interior. Bureau of Mines. Technical Paper 242. Unillustrated; pp. 20; 5½ x 9½ inches.

Abatement of Corrosion in Central Heating Systems, by F. W. Speller. Department of the Interior. Bureau of Mines. Technical Paper 236. Illustrated; pp. 12; 5½ x 9½ inches.

Coke Oven Accidents in the United States, compiled by Albert H. Fay. For the year 1918. Unillustrated; pp. 26; 5½ x 9½ inches.

Recent Coal and Coke Patents

Mechanical Stoker—R. E. Jackson and B. O. Yearwood, Princeton, W. Va. 1,319,004. Oct. 14, 1919. Filed Dec. 18, 1917. Serial No. 207,755.

Feeding Apparatus for Pulverized 1,319,348. Oct. 21, 1919. Filed April 4, 1919. Serial No. 287,382.

Mining and Loading Machine—N. D. Levin, assignor Jeffrey Mfg. Co., Columbus, O. 1,319,156. Oct. 21, 1919. Filed Oct. 22, 1910. Serial No. 588,471.

Mining and Tunnel Shoveling Machine—E. A. Hurlley, Negaunee, Mich. 1,319,220. Oct. 21, 1919. Filed Dec. 14, 1916. Serial No. 588,471.

Excavating Machine for Mining—C. H. Funkey, Ramsey, Mich. 1,319,578. Oct. 21, 1919. Filed Nov. 12, 1917. Serial No. 201,707.

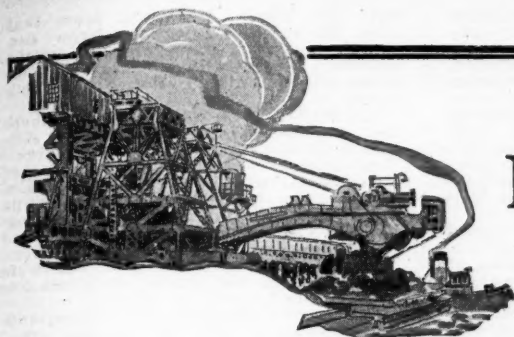
Recovery of Coal Distillation Products—H. H. Dow, assignor to Dow Chemical Co., Midland, Mich. 1,317,359. Sept. 30, 1919. Filed Jan. 14, 1918. Serial No. 211,726.

Mine Hoisting Apparatus—W. E. Grenough and S. B. Davis, Spokane, Wash., and A. Kragtrop, Mullan, Idaho. 1,317,366. Sept. 30, 1919. Filed April 13, 1918. Serial No. 229,427.

Mining Machine—R. E. Noble, assignor to Morgan Gardner Electric Co., Chicago, Ill. 1,317,812. Oct. 7, 1919. Filed Feb. 26, 1914. Serial No. 821,138.

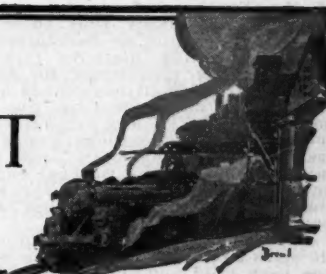
Soot Cleaner—F. W. Linaker, DuBois, Penn. 1,318,293. Oct. 7, 1919. Filed May 4, 1917. Serial No. 166,352.

Automatic Distributor Mechanism for Stokers—N. E. Gee, Altoona, Penn. 1,318,067. Oct. 7, 1919. Filed Jan. 21, 1914. Serial No. 813,507.



MARKET DEPARTMENT

EDITED BY ALEX MOSS



WEEKLY COAL PRODUCTION.

The largest tonnage of coal loaded in the history of the country was reported during the week ended Oct. 25. Preliminary returns indicate that the 123 principal carriers originated 238,759 cars of soft coal, compared with 213,729 cars during the preceding week. This extraordinary increase in the tonnage of coal loaded (11.7 per cent) was in part offset by the decrease in the tonnage of coal coked at the mines, a decrease which attended the steel strike. In spite of this handicap the total estimated production of bituminous coal (including lignite and coal made into coke) rose to 13,118,000 net tons. Final figures are expected to show that the total output approached, if it did not surpass that of the week of July 13, 1918, which has hitherto been the greatest on record.

The exceptional production was achieved through the united efforts of miners, operators, railroads and the public. Consumers purchased eagerly in anticipation of the impending strike. The miners, with few exceptions, worked loyally and faithfully. The efforts of the railroads to improve car distribution, begun last August, culminated in the largest supply of empties ever provided the mines, a supply which in many districts exceeded 100 per cent.

Anxiety felt by consumers over the impending bituminous strike was reflected in the demand for anthracite, production of which reached a new high level for the year. The week's shipments were 38,793 cars, equivalent to a total production of 1,992,000 net tons. This was an increase over the preceding week of 76,000 tons and a much more substantial increase over the corresponding week last year when the influenza epidemic was raging in the anthracite region. The week's output was, however, less than the rate maintained for some months during the summer of 1918, when production averaged 2,080,000 tons for a full-time week.

The fact that the output of anthracite responded so little to the stimulus of increased demand afforded by the strike shows the inelasticity of the anthracite supply. It indicates that any increase to be expected from the production of anthracite would avail but little to replace the capacity closed down by a general strike in the bituminous mines.

The rapid recent recovery of the beehive coke market did not continue during the week ended Oct. 25. Production is estimated at 365,556 net tons, a decrease of 4.6 per cent, when compared with the preceding week. The decline centered in Pennsylvania and Ohio. All other districts except Colorado, Oklahoma and New Mexico reported an increase.

The fifth week of the strike recorded a larger output than any other except the fourth. Production, however, is still a sixth below normal.

Shipments to the Lakes as measured by dumpings at lower Lake Erie ports declined slightly during the week ended Oct. 18. The tonnage of bituminous coal dumped (including vessel fuel) was 737,000 tons, a decrease of 94,000 tons when compared with the preceding week, but a substantial increase over the weekly average prior to the issuance of the strike order.

Total dumpings since the beginning of the season are now 20,743,000 tons, a figure less by four and a half million tons than during the corresponding period of the war year 1918.

Total shipments of bituminous coal to Atlantic Coast ports (New York, Philadelphia, Baltimore, Norfolk, and Charleston) were 3,842,900 tons during September, an increase of 11 per cent. over August, and of 6.7 per cent. over September, 1918. Cumulative shipments to tide during the first nine months of the year were 25,173,295 tons, some 4,000,000 below those of last year during the same period. The decrease is due to a decline in the coastwise movement to New England. Coastwise shipments to New England during September are reported as 748,778 tons, almost exactly the same figure as for the month before. Compared with last year, however, the month's shipments were small, amounting to little more than half those of September, 1918.

The total tidewater movement of bituminous coal to New England from Jan. 1 to Sept. 30, was 5,670,849 tons. Compared with the shipments for the same nine months of 1918, there was a decrease of 4,838,000 tons, or 46 per cent. The decrease is believed to point less to a shortage in New England than to competition of fuel oil, decline in demand following the cancellation of munitions contracts, and the large stocks carried over from last season.

Atlantic Seaboard

Boston

New England steam-users not alarmed by strike. Stocks ample for the present. Railroads in this territory not yet confiscating coal. Priorities rule will assist more urgent cases. Too early to gauge effects of restored fuel regulations. Hampton Roads market unchanged. No spot demand in any volume. Anthracite factors manage to keep up with present demand, but are anxious over future.

Bituminous—One of the interesting sidelights on the current disturbed situation is the indifference of a large number of New England steam-users. Most of the large consumers have made every effort since early summer to keep coal coming in quantity sufficient for seasonable reserves, and whether or not coal in transit is seized by the railroads there is a much more comfortable feeling on the part of buyers generally than would have been the case some years ago when it was not customary to carry such large stocks. While there have been feeble attempts the past few weeks to pyramid prices there has been little encouragement in this territory for anything even approaching a runaway market. Buyers have not "scared" for a cent, and if, as generally assumed, the situation in the central states grows acute during November there is a distinct feeling here that some arrangement will be made that will permit the mine-workers to go back and produce coal until the beginning of another coal year.

Based upon more or less accurate data there has been a statement recently that New England industries have at least a 60 days reserve. In our judgment this would be putting it small, for the average winter stock in anything like a normal year is four months, and the number of consumers who now have on hand less than that amount must be small. The larger railroads the certainly in that position,

in New England, and among those in touch with the market here there is practically no evidence of any alarm over the prospect of light production during November and December.

So far as can be learned, at this writing, the railroads here have not actually converted to their own use any commercial coal in transit. A large quantity of steam coal has been held at destinations, the railroads refusing they receive further instructions. There have been exceptions to this when it could clearly be shown that the coal was for a utility or other requirement high on the priority list.

It is strongly reminiscent of early 1918 as certain industries come promptly to the fore and insist that they are entitled to preference. There are a few smaller plants that were encouraged during the early fall to buy from time to time on the market, and what anxiety is heard is mainly from such sources. The priorities rule will doubtless be invoked considerably during the next fortnight or so, and if there are any really urgent cases they will be taken care of in that way. There is reason to expect that a large number of operations will keep at work in central Pennsylvania, but of this we shall know with more certainty in a week's time. Three holidays within the week make it especially difficult to measure the early effects of the strike.

It is also too soon to estimate the results of the restored regulations of the United States Fuel Administrator, effective from Oct. 31. Up to that time there were quotations on fair grades from central Pennsylvania all the way up to \$4.50, but the larger number of operators were insisting upon moderate quotations as more befitting the disturbed situation. Such offerings were quietly absorbed, however, through customary channels and the movement all-rail, in consequence, the past week was heavier than at any time since August. All quotations in excess of the Government set prices are now illegal, but at this writing the trade is practically deadlocked and there is little or nothing that can be said on the subject of current prices.

Shippers over the New York and Philadelphia piers are mainly awaiting developments. Those having credits in the Tidewater Coal Exchange frequently find that there is no coal available for dumping, and for the present no cars will be dumped for needs that are clearly on the priorities list. A good deal of confusion has resulted, with no little hardship to those who have boats under charter and subject to severe demurrage charges, but it is felt that things will be straightened out this week. One result was the effort of speculators to realize on coal already loaded into boats, but little has been heard of such instances since the President's proclamation.

The longshoremen's strike had already affected the volume of coal sent to the New York piers, the tie-up of steamers having caused extra loadings at Philadelphia and at Norfolk. Several ships due at New York were diverted to other ports for that reason, and this has made bunker coal much in demand at Philadelphia especially. For overseas trade the bunker price for good grades was \$6.75 and \$7.25.

There has been no particular change in the Hampton Roads situation. Practically all shipments can be made to come within the preferred requirements, and at last reports coal from the smokeless districts was coming to the piers in good volume. The more

urgent requirements are for bunker and export trade and until the output of the Southern fields is materially reduced it is likely that these loadings will continue as heretofore.

At distributing piers in this territory there is practically no spot demand. A few small buyers are anxious to get coal, but aside from these it is hard to discover any uneasiness over the outlook. Consignees whose barge transportation has been held up because of the striking tugboat engineers anticipated their wants all-rail and for the most part the coal has already been received.

Anthracite—The demand for domestic sizes continues urgent. The weather has been mild and there is not the immediate pressing demand we are likely to see later. The different distributors, both retail and wholesale, are managing to keep up with current demand in most localities, but there is much anxiety over requirements for December and January. A great deal depends upon the weather. Already the lower temperatures have been felt in eastern Maine and there are considerable areas in that region that are today practically bare of coal.

The situation with regard to ocean tugs and the strike of engineers continues without change. Ocean tugs operated by the Railroad Administration and the Shipping Board are still tied up, pending a settlement. Meanwhile the shippers are struggling as best they can to get a normal tonnage forward. Movement all-rail has been increased, and dumpings over the New York piers somewhat accelerated, and these efforts together with a number of coastwise steamers located for the movement of anthracite have made it possible to keep up New England receipts, although the coal is by no means as well distributed as when barges were moving from Philadelphia as well as from New York. Were some basis agreed upon for operating the tugs it would relieve much apprehension in New England, especially in those places where neither all-rail nor by steamer can the population be served without greatly increased cost.

New York

Strike in bituminous mines creates confusion in the New York market. With loading stopped and reinstatement of Government prices and priority lists shippers are uncertain as to operations. Demands for anthracite steam coals becomes stronger. Pea coal hard to get with demand for the domestic sizes continuing strong.

Anthracite—The pressure for hard coal is stronger because of the strike in the bituminous mines. This in conjunction with the usual requirements for this season has created a demand for the domestic coals which cannot be met, even though the mines are being worked to capacity.

The trade has been favored with ideal weather conditions and comparatively light consumption, enabling most retail dealers to store a fair supply but the demand has been steady and constant which has kept stocks down far below normal. However, consumers are in a better position than they have been, with one or two exceptions in previous years.

Shipments from the mines were not as heavy as they might have been, because of the Federal order diverting every car possible to the soft-coal fields in anticipation of the trouble there. Loading at the piers was stopped on Saturday which prevented local dealers from obtaining a full week's supply of coal. However, no one appears to be suffering from the lack of fuel.

Stove, chestnut and egg are mostly wanted in the order named, with a good call for broken which is not generally used in this market.

Pea coal has been almost entirely out of the local market, due to the increased call here and from inland dealers.

Local salesmen report a good demand from outlying sections for all domestic sizes but few reports are heard of premiums higher than the 75c differential permitted for independent coals being paid.

As was to be expected the demand for steam coals grew stronger when it

became apparent that the bituminous strike could not be averted. Many consumers of the latter who formerly used the hard coals will, it is believed, take this opportunity of returning to the use of the anthracite steam sizes. The companies are adhering strictly to their usual schedule of prices while some independents are said to be asking slightly increased prices for their product, much depending upon the supply on hand at the time inquiry is made.

During the seven day period ended Oct. 31 there were 5,465 cars of anthracite dumped at the local docks as compared with 5,507 cars during the previous seven days. There were 24,818 cars of anthracite dumped at the local piers during October as compared with 22,433 cars in September, last, and 26,616 cars in October of last year.

Bituminous—The situation in bituminous here is one of confusion. Almost up to the last minute the trade to a large degree, believed the Government would be able to avert the tie-up. Demand had dropped and quotations for the various grades at the mines and for the pools at the loading ports which had been much stronger had eased off considerably. With the Government order reinstating the priority list and the Fuel Administration price list shippers were unable to do anything and business was temporarily suspended. In addition loading at all the piers was stopped and unless shippers were fortunate enough to have loaded boats in transit their deliveries were likewise stopped.

The harbor is filled with loaded boats many of which, unless the Administration intervenes, are likely to be held until the strike is ended, at which time there will be a ready demand for coal. Empty boats are a scarcity.

Shippers during the early part of the week were able to get more coal to the loading ports because of the removal of the restrictions placed by the Railroad Administration to prevent over-stocking at the ports.

Large consumers, as a rule, have heavy stocks of coal on hand and will be able to face present conditions for a few weeks without experiencing great difficulties in obtaining fuel.

There was a report current on Saturday of last week that while the former price list of the Fuel Administration had been reinstated that a new price list showing slight increases would be issued. No one, however, seemed willing to indicate where this report started or what the difference in prices would be.

There were 5,123 cars of bituminous dumped at the local railroad docks during the week ended Oct. 31 as compared with 6,267 cars the previous week and 24,797 cars dumped during the month as compared with 23,367 in the previous month and 28,568 cars in October of last year.

Philadelphia

Anthracite consumers stirred by soft coal strike. Fear that hard coal may be affected. No easing off in demand for egg, stove and nut. Pea demand gradually increasing. Little improvement in receipts. Car supply adequate. Buckwheat coal picks up some. Rice and barley continue plentiful. Bituminous trade upset by reason of strike. Coal in transit seized. No spot market. Tide business held up.

Anthracite—As was to be expected the strike in the soft coal region has affected the hard coal trade. The public, at least that portion of it that has not yet been able to lay by its full stock for the winter, is giving the retailers considerable trouble in insisting upon prompt delivery of orders. Despite their anxiety for fuel the majority of the customers are insisting on the large domestic sizes and even though the dealers tell them that there will not be enough of such sizes to go around, they continue to ask for the favored grades, although they are willing to take a proportion of pea.

More than one dealer has had the experience of customers who never burned any other size than pea prior to the war, who now will not have that size, but want egg, stove or nut. The difference of \$2 in price is not sufficient inducement to cause them to ac-

cept pea coal. It would seem that after having once tried the larger size, which many of them did during the extreme shortage, they have now become converted to the use of the big sizes.

To make the situation worse, there has not been any increase in the shipments of domestic sizes to this market. The dealers cannot understand that after waiting all this time, that they do not receive better shipments. The rumor still persists that the New England trade is still being favored, and one report is that during the past week over 2,000 cars of large sizes were shipped into the state of Massachusetts alone.

While recently there was some tendency of a car shortage in the anthracite region, it is believed that the soft coal strike quickly remedied this situation, as from last accounts there are plenty of cars to be had.

While pea coal is not selling in the volume expected at this time of the year, the dealers report that it is picking up all the time and it is felt that with the arrival of more seasonable weather they will receive as much business on this size as they can take care of. They also expect the demand to increase from those customers, who have been holding off waiting for the larger sizes, for the feeling is now growing that even though the anthracite miners have agreed to continue work, there is always the possibility of a sympathetic strike.

One of the large companies this week announced an increase of 40c a ton in the price of broken coal. This size has been selling right along at \$5.95 per ton, whereas egg coal, a size which is often used in the manufacturing trade as a substitute for the larger size reached its maximum winter price on Sept. 1 of \$6.35. With the 40c increase broken is now on a parity with egg. There is little domestic demand for broken coal, and quite a little tonnage is under contract at the old price of \$5.95, and it is thought the increase was made more to equalize conditions than for any other reason.

There is some stir in the steam sizes, which may probably be due to the strike situation. There is nothing like a rush to procure coal, but inquiries are beginning to come in from new sources and the companies are having no difficulty lately to move their buckwheat coal. It has also been said that in at least one instance this size has been taken out of storage at a moderate extent. While rice and barley are still extremely plentiful, the demand is yet below production.

Bituminous—At this time the bituminous trade is badly upset. With the walk-out of the men production has practically ceased. Fortunately local industrial plants are pretty well fortified with stocks of fuel, and it has been estimated that this district could get along fairly well for the next two months. Many of the plants had heavy tonnages in transit at the time the trouble broke, but because of the ruling of the Railroad Administration all of this coal has been confiscated and all users of bituminous have been so notified by the railroads.

At this time the trade is in a chaotic condition, as with the fixing of the prices by the Fuel Administration all competition has been taken out of the market and there is no business in the spot trade. At this time it looks as though the only production likely to reach here for the next week or so will be from the wagon mines, which are fast resuming the activity enjoyed by them during the war.

All tide business has practically ceased for the time being, as orders have been issued to stop loading boats for export. As a matter of fact a number of vessels which had left their piers were recalled before they had passed out of the bay and were ordered to return to port.

Lake Markets

Pittsburgh

Leading coal operators holding prices down. Brokers secure fancy prices. No strike in Connellsville region.

At this writing the latest news in

connection with the coal strike is that Federal Judge A. B. Anderson, at Indianapolis, on Oct. 31 issued a temporary order restraining officials of the United Mine Workers from calling their strike, set for midnight, Oct. 31. This morning President Wilson signed the Fuel Administration order setting maximum coal prices at the last Government figures. Philip Murray, president of No. 5 district (Pittsburgh) says he will ignore the injunction.

In the past week Pittsburgh district coal has brought some very high prices, but the total turnover at fancy figures is asserted to be small. Large operators state that they have not charged extra prices and assert that if high prices are charged to consumers it is by jobbers. Some of the jobbers admit making large margins, but claim that operators have also charged high prices.

A number of sales by jobbers are reported at about \$5 for prepared sizes of gas, while mine-run steam coal has brought \$4 and higher. Large operators claim to have sold at much lower prices and on the basis of their position the market of the past few days may be quoted as follows: Slack, \$2.20 and \$2.30; steam mine-run, \$2.30 and \$2.40; gas mine-run, \$2.50 and \$2.70; prepared sizes gas, \$2.90 and \$3.10, per net ton at mine, Pittsburgh district.

While at this writing the extent of the strike, if any, is problematical one thing of importance to this general district is that the union miners will be unable to get the Connellsville region, which has always been non-union, to strike, as Federal protection will prevent that. The Connellsville region now ships about as much coal as it converts into coke in the region, and lately the proportion has been abnormally large through coke production being restricted on account of the iron and steel strike making a number of blast furnaces idle.

Buffalo

More and more quiet in bituminous. Not much trade expected during November, whether a strike occurs or not. Heavy stock on hand. Anthracite moving heavily by lake. Not much locally.

Bituminous—The demand is light, the supply is not only light, but growing lighter and more uncertain every day. The railroads are taking it in quantity and the manufacturers do not want much more right away. They have, as a rule, several months' supply in yard. The shippers have made it plain to them that it was to their advantage to keep a supply on hand and they have done so. Now they are feeling quite independent of a strike and will wait awhile before buying in any amount.

At the same time quite a good amount is coming from the mines, but the roads are taking it so fast that the Lake trade is feeling the shortage and there are already more than 40 big steamers laid up for the season. There are enough left to take care of the business offering. Grain does not promise to move at all freely and if it should the giving out of the ore supply early would make tonnage plenty for any sort of down cargoes. All the coal, both hard and soft, will be shipped to the Lakes that can be got to the docks for loading.

The situation is, a short bituminous supply to the Lake trade, but a large anthracite supply. The railroads are securing orders from government authorities for coal to be delivered to them. The absence of war-time emergency conditions seems to make no difference to the roads, but the shippers do not see it that way and much prefer to fill their regular orders. If the strike comes to little the roads will not long ask for privileges of that sort.

It is not easy to state the price conditions. A few shippers are asking 50 cents to \$1 premium on their coal over former prices. Many of them are not even doing that. With this in mind it is thought best to continue former quotations, as follows: \$4.55 for Allegheny Valley sizes, \$4.80 for Pittsburgh and No. 8 lum, \$4.65 for three-quarter

same, \$4.20 for mine run, \$4.10 for slack, \$4.60 for smokeless, \$5.75 for Pennsylvania smithing, all per net ton, f. o. b. Buffalo.

Anthracite—The trade does not change materially. City consumers are asking for more all the time, but the distributors and retailers say they are promised a good supply when the Lakes close and in that way are able to reduce complaint to the lowest. It is likely that more coal is in cellar now than there was last year at this time. The mild winter made it quite unnecessary to put in an average supply. All the wise ones are predicting a warm winter, but they did also two years ago, so no dependence can be given them.

The independent anthracite shipper is asking all the way from 75 cents to \$3 premium on his supplies, but the regular prices remain just what they were when the last advance was made on Sept. 1, as follows:

	On Cars, Gross Ton.	At Curb, Net Ton.
Grate	\$8.55	\$10.20
Egg	8.80	10.65
Stove	9.00	10.85
Chestnut	9.10	10.95
Pea	7.45	9.30
Buckwheat	5.70	7.75

The lake shippers of anthracite are still increasing their loadings, but the Upper-Lake docks want more and more. The surplus over last season is large and fast increasing. For the week the mount was 145,300 net tons, of which 88,100 tons cleared for Duluth-Superior, 17,400 tons for Milwaukee, 15,800 tons for Chicago, 11,200 tons for Fort Williams, 6,400 tons for Marquette, 3,600 tons for Manitowoc and 2,800 tons for Hancock. Rates are unchanged.

COKE.

Buffalo—The coke market will hardly be brisk again this season, for all branches of trade in connection therewith are decidedly dull. Too many Lake steamers have been put into the Iron-ore trade, till the Lower Lake docks are piled high with it. Coke therefore remains dull at former quotations: \$8 for 72-hr. Connellsville foundry, \$7.50 for 48-hr. furnace, \$7 for off grades, \$7.75 for domestic sizes and \$5 for breeze, all per net ton f. o. b. Buffalo.

Toronto

Market conditions unsettled—Prices of bituminous advanced. Shipments taken over by railroads. Use of anthracite by industrial plants prohibited.

Conditions in the coal trade are considerably unsettled owing to the strike of bituminous coal miners in the United States. Prices for soft coal have substantially advanced and many industrial consumers who had been buying from hand to mouth, are now ordering freely, so that supplies on hand may shortly be exhausted.

During the last few days, shipments of bituminous from the mines have been taken over in transit by the American railroads, so that future supplies are very uncertain. H. A. Harrington, of the Ontario Fuel Administration, announces that the industrial plants will be restrained from using anthracite except with the written consent of the administration. Shipments of anthracite are still coming through, but in quantities insufficient to meet the demand.

Quotations for short tons are as follows:

Retail—Anthracite: egg, stove, nut and grate, \$12.50; Pea, \$11.00; bituminous steam, \$8.95; slack, \$7.95; domestic lump, \$10.00; cannel, \$11.50.

Wholesale—f. o. b. cars at destination: three-quarter lump, \$8.00; slack, \$7.00.

Cleveland

Coal fields from which Cleveland and northern Ohio draw their supplies are so well organized it is expected shipments will be entirely cut off in a few days. For three days now practically no receipts are reported, while the Lake trade has been cut off to the point of denying Great Lakes freighters fuel coal.

Bituminous—Since Thursday practically no bituminous coal has been received in Cleveland, the carriers standing between the consumers and the mines. Cleveland normally receives about 25,000 cars of coal a day, of which 90 per cent is bituminous. About 5,000 cars a day are required by public utilities and such other essentials as hospitals, the street railway, and the like. It is estimated that the larger electric light corporation of the two here has from four to six weeks' stock on hand. Domestic consumers are said to have laid in 85 per cent of their winter supply.

Iron and steel works have just begun to resume, and are now operating at about 20 per cent of the district's capacity, but as they have practically no stocks on hand early closing for them is seen. The by-product coke plants in this district are amply stocked, and it is claimed they can operate long after coke-using plants will be forced to close. Most industrial consumers cannot operate longer than two weeks, if the strike is made anywhere near effective.

Operators have been quite successful in their attempts to hold down coal prices, and while a few bituminous grades have doubled supplies have not, the main reason for this has been to put them on a parity with grades advanced a week ago.

Public opinion in Cleveland appears unanimous against the strike. Operators are claiming that Monday will show not nearly so many men out as union leaders claim. Several of the iron and steel plants here that have their own coal mines say their miners have declared their intention of staying on the job.

Pocahontas and anthracite—While some cars have filtered through the blockade of the railroads in the last three or four days demand for these grades have double while supplies have virtually been cut in half. Some dealers have stopped handling forke. Pocahontas. Most dealers still are taking orders for these grades, but are not promising delivery as they fear a tie up in the bituminous fields will also affect the Pocahontas and anthracite mines.

Lake Trade—Under orders from the railroad administration absolutely no coal is permitted to be placed for the Lake trade. It was expected that shipments to the head of the Great Lakes would be cut off, but the ban on bunker fuel was a surprise. Unless lifted immediately—and many in the Lake trade believe a mistake has been made—Great Lakes freighters must be taken out of commission at their last port of call. This will tie up the iron ore and grain trade, the latter being especially heavy toward the end of the season. Friday saw only 5,047 cars of bituminous coal at the lake front, with loadings totalling only 1071 cars and less than 1800 cars in transit. This means that Saturday sees virtually the last coal loading in the Lake trade. The movement of late has been only about half of normal, and unusually heavy demands will be made later on the all-rail movement from Indiana and Illinois to the Northwest.

Prices of coal per net ton delivered in Cleveland:

Anthracite—Egg, \$11.75 to \$11.90; Chestnut, \$12 to \$12.20; Grate, \$11.75 to \$11.90; Stove, \$11.90 to \$12.10.

Pocahontas—Forked, \$10 to \$10.50 Shoveled lump, \$10; Mine-run, \$8.

Domestic bituminous—West Virginia splint, \$9; No. 8 Pittsburgh, \$6.60 to \$6.90; Massillon lump, \$8.25 to \$8.50; Cannel lump, \$10.50; Coshocton lump, \$7.50.

Steam coal—No. 6 slack, \$5.25 to \$5.50; No. 8 slack, \$5.10 to \$5.50; Youghiogheny slack, \$5.25 to \$5.50; No. 8 ½ in., \$6 to \$6.25; No. 6 mine-run, \$5.25 to \$5.50; No. 8 mine-run, \$5.75 to \$5.90.

Columbus

With all miners out in Ohio the coal trade is at a standstill. Demand for domestic grades is strong, while there was a reaction on steam grades. Considerable uncertainty is apparent in the strike situation.

Practically all Ohio coal miners went out Nov. 1, closing all of the mines in

the state. This was in accordance with the strike order issued by the officials of the miners' organization. Previous to the suspension there was a general buying movement, mostly on the part of domestic users. The strong demand for steam grades, apparent several weeks ago had subsided to a certain extent. The suspension had been discounted on every hand and it is not believed that there are prospects for any marked coal shortage within the coming 30 days.

Domestic trade has been the strongest point in the market. Retailers have been placing large orders and have been urging immediate shipment. Retail stocks are not large, although there has been a steady accumulation during the past few weeks. Many of the dealers have been following a plan of cutting orders down in tonnage in order that all consumers have a chance for some coal. Retail prices are firm at former levels, as the new price-fixing notice had not yet taken effect. An announcement as to Ohio prices is expected soon.

The steam trade is active, although the rush of buying noted several weeks ago has passed. There has been enough orders, however, to absorb all of the available tonnage. Prices on steam grades were boosted under the influence of better buying and remained at the higher levels until price fixing became effective.

A canvass of the situation shows that most of the steam users have fuel supplies for a month to six weeks and many are even better supplied. Public service concerns are pretty well looked after and the same is true of public institutions. Rubber plants have ample supplies and general manufacturing will not suffer immediately. The railroads are expected to confiscate much of the coal now a wheel in order to provide a fuel supply.

The Lake trade has been active and a considerable tonnage is being moved to the Northwest. This movement is expected to cease soon, not only because of the suspension but also because of the close of navigation. Practically all of the desired tonnage has been moved to the Upper-Lake regions.

Production during the last week of operation was at a high rate. With a better car supply in all mining districts there was a large tonnage produced on all sides. The new orders concerning the unloading of cars stimulated the production and it is estimated that the Hocking Valley produced about 85 per cent. of capacity with other fields showing up with slightly lesser percentages.

Louisville

Price control meeting with much disfavor in Louisville. Kentucky mines operating at nearly half time as a whole. Retailers out of coal. Railroad Administration holding supplies.

Kentucky operators, jobbers and retailers are much concerned over price regulation, which it is claimed will wreck some of the operating companies unless many changes are made. Operators point out that such action is unconstitutional, and decidedly unfair. One operator in discussing this point said: "If the administration can force maximum prices on all coal sold, it should also arrange for us to secure the same maximum prices on coal sold under contract last spring. We took heavy tonnage orders with the Railroads and other industrial consumers on steam coal at far under the market in order to force movement of such grades, and put up domestic prices to equalize the low steam prices. Now we are expected to sell our block coal at prices much lower than had been figured on, and in selling steam at contract prices and old administration prices we will be unable to exist in some cases. The war is over and there is no reason for controlling prices. A readjustment is bound to come, or a lot of mines will be forced under."

The action of the Railroad Administration in seizing all grades of coal and holding them is also severely criticized. The railroads are seizing all block, steam and screenings under orders, and clogging sidings, yards, etc., holding coal under load, whereas it should be moved as rapidly as possible so that the cars may be unloaded,

and placed back in service. Mines at the present time are securing full car supplies, but this can not last long if the roads are to be glutted with loaded cars, and the supplies of empties reduced. In fact there will not be room on sidings to accommodate the coal, and trouble is bound to come when an effort is made to get this coal moving.

Louisville retailers at a meeting on Monday found that 19 dealers had just 7,000 tons of lump or back coal in their yards, all of which was sold. A few thousand tons of steam coal was on hand, a considerable portion of which was also sold. It was reported that cars delivered to retailers on Saturday and Monday were later removed by switching crews before they could be unloaded. Forty-two cars consigned to retailers are held in local yards, and it is known that 157 cars shipped from Kentucky mines to local retailers are being held. Retailers are taking practically no orders as they haven't coal to fill orders, and are not sure of prices.

The strike situation in Kentucky is not considered serious, and it is believed that most districts will be operating again within a week or 10 days. In northeastern Kentucky many union mines in the Elkhorn and Big Sandy district are running. Hazard operators report practically full operations. The Harlan district is down tight, as is most of the Southern Appalachian which is well organized. In the Harlan district operations are running full at Lynch, Ky. The owning company is said to be paying higher wages than the union scale, as it is not a commercial development in any sense of the word, and not controlled by any wage agreements of the Fuel Administration period. The Wisconsin Steel Co. mines at Benham, Ky., will probably be running full within a day or so.

In western Kentucky the miners refused to go out in violation of a wage agreement made when the mines were organized in September, and 47 mines, mostly union operations, in Hopkins, Christian and Webster counties are running full. These mines have a big production and are said to be operating profitably, as they hadn't contracted much coal, and prices were not much above former administration figures. These mines are now producing coal at \$2.60 for lump, \$2.35 mine run, and \$2.05 for screenings, and are reported to be working full with a full car supply.

The effect of the big operations in these counties is resulting in miners in Henderson, Muhlenburg and other counties being anxious to get back to work. A union meeting at Henderson, Ky., on Monday was postponed, as union leaders feared the men would go back to work on a vote. Evansville, in southern Indiana reports that miners are dissatisfied with the strike, claiming that they didn't have a say, and should have been given a vote.

Federal troops have been moving freely from Camp Taylor for several days to mine districts in West Virginia, and it is reported that a big detachment is at Knoxville, to keep peace in both street car and mine strikes. Everything has been quiet and orderly in Kentucky so far, as the miners as a rule don't appear to be enthusiastic over the strike, and apparently merely answered the union call. In Bell and Harlan counties, it is reported that the strike is firmer than in any other section of the state, and that these counties will probably be the last to surrender in event the strike is broken.

So far as the strike is concerned operators appear to be optimistic, and feel that it will only be a few days until troubles are adjusted. However, the price-control plan is causing a great deal of uneasiness in every branch of the coal trade.

St. Louis

Strike finds St. Louis with about 10 days supply of coal ahead for domestic uses among dealers. Steam plants average 30 days. Railroads average 10 days. Situation will be appalling if strike lasts more than two weeks. Railroads holding all coal under orders from the Government. Country without fuel in many cases.

Situation in St. Louis proper is allright for the present, but at the expiration of 10 days the situation will be extremely critical, for then many of the householders will be out of fuel, some steam plants, and there will be no coal available from the retail dealers. About 25,000 to 30,000 tons are in storage, but this will last but a day or two. The average domestic consumer in St. Louis has enough coal to hold him for 60 days. The average steam plant has 30 days supply.

A large element of poor people have but little coal and thousands of people who are obliged to move on account of the high rent, etc., are without fuel.

Nearly all the coal shipped the last two or three days in the month is being held by the railroads before being delivered, so that the Government may appoint fuel administration officials to distribute it according to priority rulings. Thus at the end of the week the situation is somewhat uncertain.

There are thousands of cars of coal in and around the St. Louis terminals. The ten days supply held by the railroads will probably require that a large part of this be confiscated.

E. F. Bush, regional director of the southwestern region for railroads, has his committee appointed Saturday but would not make an announcement until he ascertained who would co-operate with them from the Fuel Administration. This committee will regulate the distribution of coal according to the priority rulings.

In the last few days from the Cartersville field little coal was shipped to this market. The Iron Mountain held nearly all of the coal loaded on its rails. The tonnage of railroad coal from the entire field was the heaviest on record. The same applies in a way to the Duquoin field, where the car shortage was somewhat severe.

In the Mt. Olive field the railroads took the greater portion of coal mined in the past week. The car supply also held the tonnage down, but a fairly good volume moved into the St. Louis market and some into the country.

In the Standard district the railroads, as usual, got the bulk of the coal. The mines worked better the last week than they have for some time as far as the equipment is concerned and every mine came close to producing its daily capacity.

The latter part of the week the announcement of the Government price caused some uneasiness and uncertainty in the wholesale market. The retail price, however, is unchanged and will likely continue that way on all of the coal shipped that will be delivered to the dealers.

Public sentiment is strongly against the miners and the feeling in the coal trade is that something will happen in the course of a week to ten days that will likely bring about a resumption of work in the course of two weeks.

There is little Cartersville moving in. It is all going at the regular price, with few exceptions. Cars are somewhat short on the Missouri Pacific and on the Illinois Central.

In the Duquoin field cars are short, about three days a week being the supply. Some of this coal is being held at the circular price and some of it is being sold at whatever it will bring.

In the Standard field there has been much profiteering on the part of a few unscrupulous operators. The big operators are holding a circular price that is within reason. Two-inch lump coal has sold as high as \$4.50, mine run from \$3 to \$3.50, and screenings at about \$2.50.

On Friday W. J. Jenkins, of the Consolidated Coal Co., called the operators together and in co-operation with the Chicago operators, who are co-operating with the Government, decided that a maximum price of \$3.25 on domestic sizes, \$3 on mine run and \$2.25 on screenings should prevail, with a 25c commission to jobbers over and above that price, the 25c to be the limit on the jobbing business, regardless of how many hands it passed through. This has stabilized the market and although there is a shortage of coal and nothing is offered free, there is an easier feeling and the public is not incensed.

There has been an advance of 50c a ton this week on the retail price of all soft coal in St. Louis, making Cartersville \$6.50, Mt. Olive \$6, and Standard \$5.50.